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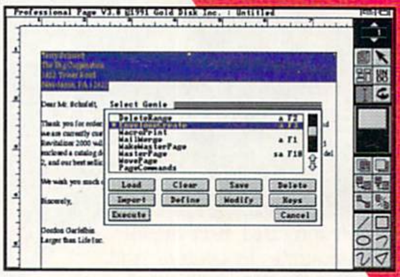
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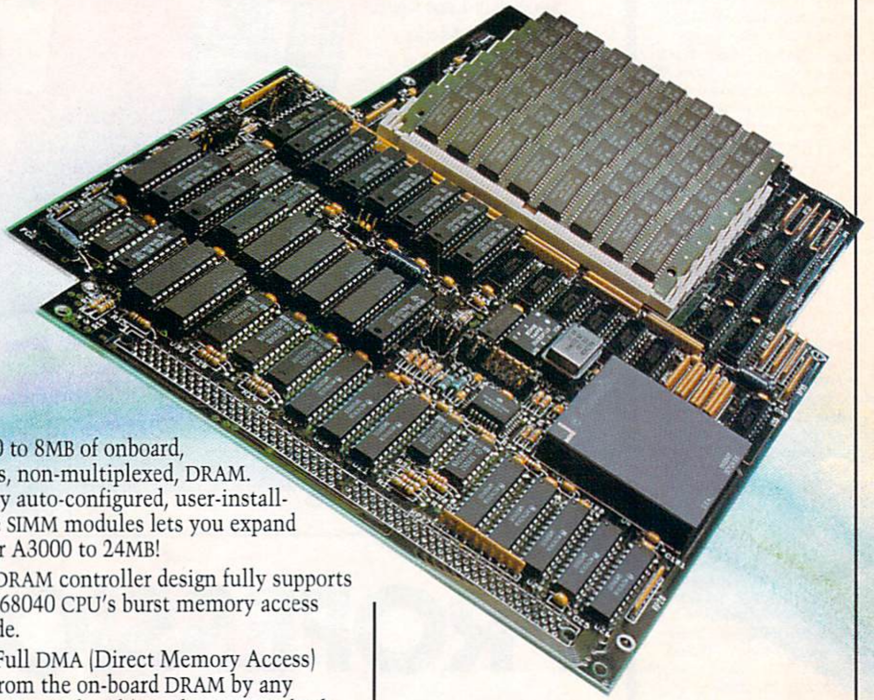
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**WATCH OUT FOR SLOW DRAM BOTTLENECKS**

*Yes*, all 68040 CPU's are created equal *but* this doesn't mean that all accelerator boards allow *your* A3000 to make the most of the 68040 CPU's incredible performance.

The A3000 was designed to work with low-cost, 80ns DRAM (memory) technology. As a result, anytime the '040 CPU accesses the A3000 motherboard, memory lots of CPU *wait-states* are introduced and all the reasons you bought your accelerator literally come to a screeching halt!

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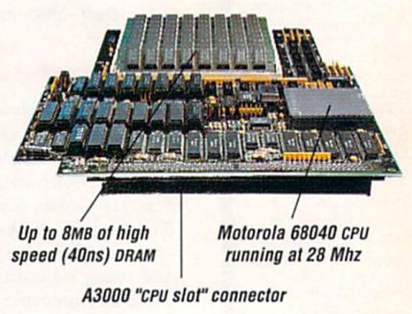
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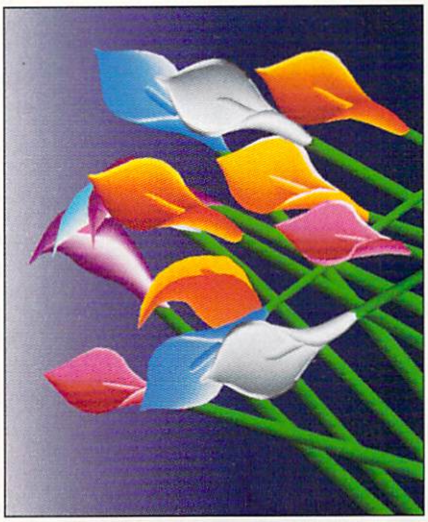


## ARTICLES



## COLUMNS





*Getting what you do* ***on*** *your computer* ***out*** *of your computer in quality fashion is paramount. That's why our features this month stress techniques for obtaining top-notch output, tips on buying printers, and practical advice on setting up desktop-publishing operations. Whether you're preparing artwork for exhibition or producing a job for a client, you'll find our "Amiga Output" special will help you get the best* ***results*** *possible.*



## DEPARTMENTS



## REVIEWS



## GAMES



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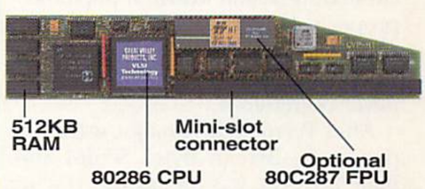


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# CHIEF CONCERNS

*A personal computer can create a degree of freedom even within prison walls.*

### Amigas on the Inside

SOME WHO ARE sentenced to a long stretch in prison have a bleak outlook. Life on the inside is full of drudgery, fear, and anger. And when they get out, it's usually more of the same. Others, however, learn new skills, write books, act—anything to prepare themselves for a productive return to society.

Brad Perrott is currently serving a life sentence at the Warkworth Institution in Campbellford, Ontario. He hopes to be released in 1994, at the age of 47. If he does get out, Perrott shouldn't have to flip burgers at the local Big Boy; instead, he will become involved in making video, thanks to countless hours spent using the Amiga.

> **He blew $900 on his computer, giving up the chance to get a color TV, stereo, or fancy clothes. He has never regretted it.**

When Perrott bought his A500 in 1988, inmates were allowed to purchase only $1000 worth of personal property. He blew $900 on his computer, giving up the chance to get a color TV, stereo, or fancy clothes. He has never regretted it.

After Perrott's first major software purchase—Byte by Byte's Sculpt Animate 3-D—he was off and ray tracing. He also picked up Electronic Arts' DPaint II, and, with the help of his pal Wayne Boden, started broadcasting a schedule of the videos to be shown throughout the prison. They began by creating six screens, but after various other prison groups wanted in, their work outgrew the paltry memory of the standard A500.

An extra 512K took care of that problem, at least for a while. Now the system is punched up with a GVP 42MB Series II hard drive, an extra 2MB of RAM, and an accelerator. And Brad and Wayne have moved up to scripting with Right Answers' The Director.

The current Director application they have built presents a requester that allows the user to select a title animation or a title screen. It then automatically reads a list of videos from ASCII and displays it on the chosen screen. The Director also reads in advertisements from an info.data file and places them within a screen that's created from DPaint III or NewTek's Digi-Paint 3. All this now runs in hi-res overscan, thanks to Perrott's one-megabyte Fatter Agnus chip.

This work got Perrott more interested in video, and $99 later he became the owner of a Mimetics' AmiGen, which he now uses to enhance videos that are shot by various prison groups.

Perrott says that one of his biggest challenges is interesting the 25 or so other Warkworth A500 owners in advanced uses of the Amiga. But an assortment of top-notch games keeps this group fairly well occupied, he reports.

Warkworth prison officials recently upped the amount of money inmates can spend on personal possessions, so Perrott is thinking ahead. On his agenda are the 2.0 operating system and a digitizer. Perrott's greatest Amiga dream, though, is to own a system that includes a NewTek Video Toaster.

Perrott is now trying to convince officials to scrap plans for an expensive PC-based video system, and instead to let him do a more complete job with a couple of A3000s. Sounds like a good idea to me.

### Time To Program

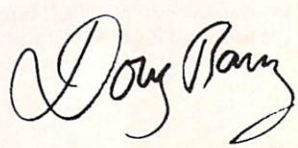
FOUR OR FIVE years back, I corresponded a bit with a David Duhaime, a prisoner at the Washington State Reformatory, and I'd guess he's still there. This guy was obsessed with programming, but, making only $26.40 per month, he lacked the money for a decent software library. I sent him every Microsoft language I had at the time. To me, they took up shelf space. To him, it was like a gift from God.

At the time, Duhaime claimed that Washington State Reformatory was the only house of correction in the US that allowed inmates to own a PC. Like many near-sighted corporations, the prison had strict standards as to what could be used. Unfortunately, it had to be an IBM compatible, and no modems were allowed. I'm not sure if they allow Amigas yet.

Personal computers, even IBM compatibles, have the power to change lives. There is no certainty about it, but in the case of prisoners, it is a *chance* for a new start. Each one can decide what he wants the computer to do. Some may become financial wizards, or programmers, or designers. And these skills, rather than prison garb or a regrettable past, form the identity of the person at the keyboard.

An Amiga computer system is especially well suited for rehabilitation. It is cheap and powerful, and can easily tap into creative powers. It can reward hours of effort with a beautiful animation, a stunning graphic, or a multimedia mindblower that makes you proud.

The Amiga may not be able to save the whales or patch the hole in the ozone, but it might make a difference in one man's life. ■





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- High Performance, Auto-booting, DMA SCSI controller which can DMA directly to/from the full 16MB range of 32-bit wide RAM — just like the A3000!
- SCSI connectors for connecting both internal and external SCSI peripherals.
- Hardware support for mapping the A2000 Kickstart ROM into the high-speed 32-bit wide on-board RAM. It's like caching the entire operating system!
- Icon-based, Software Switchable, 68000 Fallback mode.
- Converts to Hard-Disk-Card with Optional Hard Drive Mounting bracket.



*G-FORCE 030-50/4 with optional "Hard-Disk-Card" Conversion Kit*

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# OVERSCAN

## News, New Products and Networks

## AmiEXPO Long Beach: High Seas, Low Attendance

LONG BEACH, CALIFORNIA—The rains that flooded Southern California ceased in time for the opening of AmiEXPO, held February 14–16 on board the Queen Mary, which is now permanently docked in Long Beach.

Unfortunately, the rain returned with a vengeance on Saturday, keeping many would-be attendees nestled in their homes. Disappointing also was the low vendor turnout, apparently the result of a glut of Amiga shows and conflict between competing show groups unable to agree on a coordinated show schedule. Among the missing were Commodore, GVP, Progressive Peripherals, Impulse, and myriad others. NewTek had a very small presence as part of the ***Bread Box*** Toaster magazine (RS# 120) booth.

Image-processing kingpin ***ASDG*** was there, though, with an especially unique "exhibit." The firm curtained itself off from the crowd and conducted a three-day focus-group session, questioning customers about what should be added to Art Department Professional. I did get a quick demo of ASDG's new program, **Fred**, a terrific system for batch processing frames. Fred allows you to easily add Toaster-style effects to single-frame recorded animations. ASDG is also working on motion blurring for digital video. (RS# 121.)

### Greater Access

I unfortunately missed the hottest product of the show. ***INOVAtronics*** flew in the UK-based designer of its **HiQ A500 Tower**, who set up the product late in the show. According to INOVAtronics, the HiQ's video slot can run 68040 accelerators and NewTek's Video Toaster. This $699 product could be a boon to A500 owners eager to use the latest and greatest A2000 peripherals.

INOVAtronics also popped out **CanDo 1.6**, which adds game-port support, proportional sliders, and more ARexx functionality. (RS# 122.)

***Digital Processing Systems*** drew raves (I sure gave it one) with its new DPS **Personal V-Scope**. For $955, it gives you a waveform monitor and vectorscope on one card. With a standard composite video monitor, you can have a full-screen waveform or vectorscope, or view them both on a single screen. (RS# 123.)

***Gold Disk***, which reported brisk business, highlighted **Professional Page 3.0**, which should be shipping by the time this issue hits the stands. The new version automates many layout tasks and supports Adobe Type 1 fonts. (RS# 124.)

If you have a Commodore A2630 accelerator, ***CSA*** promises to double your speed with the $699 **Rocket Launcher**. This product replaces the standard 25-MHz '030 with a 50-MHz version. The firm also showed a new generation of its popular **MegaMidget Racer**. (RS# 125.)

***Supra*** pulled in crowds with its range of **fax modems**, priced from $199.95 to $399.95. (RS# 126.)

### Bugs and All

***Rimik*** displayed its **Beetle Mouse**, a $49.95, 320-dpi replacement mouse. The two-button device looks a bit buglike, comes in a variety of bold colors, and includes an extra long cord. Remix

*Continued on p. 14.*

## About Faces

The good news: AmigaDOS 2.0 supports Intellifont scalable typefaces. The bad news: Only three fonts are included. The best news: ***Agfa Corporation*** now offers 15 scalable **font packages** for the Amiga, plus many more individual volumes (four typefaces each, $99). The word-processing and desktop-publishing series is composed of Styles Unlimited (25 typefaces, $199), Laser Type (35 faces, $199), Office Communications, Bulletins/Newsletters, Presentations, and Publications Packs (12 faces and $159 each), and Amiga Starter and Amiga Companion Packs (four faces and $69 each). For projects that need an artistic flair, check out the five-volume decorative series (six typefaces and $129 per volume) or the Amiga Decorative Starter Pack (four faces, $69). Video Unlimited ($199) includes 25 typefaces optimized for video work. With a total of 250 designs in Agfa's Intellifont library, you won't run out of choices quickly. (RS# 110.)

*CG Times Italic*
**CG Times Bold**
**CG Triumvirate Bold**
CG Triumvirate Condensed

**Put a good face on it with the Amiga Starter Pack.**

## The PC Connection

For more Bridgeboard speed, consider the 80386 20-MHz **Bridgeboard Enhancer** ($449) from ***ATOP***. The Bridgeboard Enhancer is a small module that replaces the 80286 chip of the A2286 AT Bridgeboard without cutting or soldering. It works with an 80287 math chip and promises a Norton processor speed of near 20.7. (RS# 112.)

For better Bridgeboard relations, check out the **Ambassador** ($79.95) from ***Consultron***. Based on the company's CrossDOS software, the Ambassador allows you to access Amiga-connected floppy drives as MS-DOS drives and boasts it will provide faster access to data

*Continued on p. 14.*

**To contact the vendors of products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 84.** ►

## Who's Who Helper

Tired of hunting through a mess of tiny note papers looking for that phone number you had just a minute ago? **The Contact** (***Consultron***, $59.95) address and phone database can help you tidy up.

Called by a configurable hot-key, Contact lets you create, edit, and access multiple phonebooks. Need an address for a letter? Call it up in Contact, tell the program to type it into your text window, finish your letter, and then configure Contact to print a label for the envelope.

Contact can store up to two telephone numbers for each address and can dial either one if you have an autodial modem. Contact's ARexx interface lets you customize the program even further. As a bonus, CalcKey, a hot-key-accessible calculator, is also included for standard, scientific, and programming math. (RS# 107.)

## Curves Ahead

***Technical Tools*** offers 3-D modelers a new twist and enhanced convenience with **Lissa** ($35), a Lissajous curve generator for Imagine and Turbo Silver. Lissa generates Lissajous path objects that you can, for example, use as flight paths or as backbones of extruded objects. You control these paths via a window on Workbench or an ARexx script. (RS# 104.)

## Programmer's Toolbox

Want an easier way to define structures in C? **IntuiGen 1.0** (***J. Miller & Associates***, $34.95) generates definitions for NewScreen, NewWindow, Menu, MenuItem, IntuiText, and Gadget (Boolean, string, and proportional) structures. The WYSIWYG interface's load-and-save features let you alter code later. (RS# 101.)

Composed of 11 command-line utilities, ***Quma Software***'s **QVCS** (Quma Version Control System) automatically tracks your source and binary files through development, saving the differences between various revisions in a single file. The lock-file protection lets you use multitasking QVCS ($99) on networked systems, and for multi-developer projects, QVCS coordinates accesses and updates to shared modules.

Need to backtrack? The program retrieves previous file versions and supports journaling. Other handy features include an editable message file that defines the

*Continued on p. 14.*



# ON-LINE SCAN

**By Tim Walsh**

Occasionally, a piece of Amiga software worthy of becoming folk-ballad material appears in the public domain. These programs are usually small yet remarkable utilities that make life easier in one way or another. Such is the case with **MultiDOS**, a 34K program by Kjell Didriksen that qualifies as the handiest Amiga/MS-DOS converter of all time.

An earlier Amiga-to-MS-DOS conversion program, **CrossDOS** ($39.95, ***Consultron***), first appeared several years ago. It won the respect of many, including me. CrossDOS alone elevated me from ordinary computer geek to "nice-guy" status in the eyes of *AmigaWorld* Sales and Marketing staffers who often need Amiga files converted to MS-DOS format.

I knew the practicality and pitfalls associated with conversion programs, and CrossDOS allowed me to perfect the art of making PC files Amiga-compatible and vice-versa. I learned to overcome quirks in its behavior, I downloaded software updates as they appeared infrequently on the nets, and I convinced myself that the program was all I would ever need for MS-DOS conversion.

But MultiDOS, the PD alternative to CrossDOS, puts the commercial program to shame. With MulitDOS, there's no secret sleight-of-hand tricks to learn, no semi-secret updates to download, and virtually no documentation needed in order to use the program. You simply decompress the software by using the Arc utility and copy one file to your l: directory, another to devs:, and a couple more to your System directory. Then you're in business.

Unlike early versions of CrossDOS that sputtered to a halt under AmigaDOS 2.04, you can turn MultiDOS on and off with the CLI/Shell commands PCMountAll and PCKillAll, respectively. Furthermore, you can format low-density MS-DOS disks on any Amiga floppy device with the command PCFormat. (You can safely shorten the commands by renaming them or by adding a line such as Alias PC PCMountAll to your Shell-Startup.) After several months of heavy use, I have yet to see MultiDOS crash, and it remains bulletproof to the operating system under just about any conditions.

Even if you do not have access to a PC-compatible, I recommend this file for future reference. GEnie users can look up file number 13661 in library 33, and you can find it in the CompuServe AmigaTech library #11 as filename MLDOS1.LHA. On Portal, the program is file number 90 in the Amiga area "File Libraries/Misc Stuff." You can also find MultiDOS on BIX under the name MULTIDOS-.LZH in the Amiga.listings area.

### A Bid for BIX

Speaking of BIX, Byte magazine's telecommunication arm was recently acquired by General Videotext Corporation. To learn more about this sale, I posed some questions to BIX. The responses I received were surprisingly upbeat. According to BIX's Amiga Editor, Joanne Dow, you can expect to see better organization and new help-line operators.

Sometime in the near future, BIX will probably move to a new location, which could mean increased access capability from Tymnet. In turn, BIX would be able to handle as many as 500 users at a time, rather than the current capacity of 140. The move could result in a 24-hour interruption of service, but all except the most infrequent users should have plenty of warning, as BIX will try to notify subscribers well in advance of any down time.

Dow also noted that BIX will remain the BYTE Information Exchange, with heavy BYTE participation. So, fellow BIX users, set your minds at ease. In these dismal economic times, positive business news is in short supply. That emphasizes Dow's upbeat prognosis: "I am excited by the prospects for BIX and BIX's future, including significant growth. It appears this has the distinct possibility of being a singularly good thing for BIX."

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800/227-2983

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800/848-8199

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***With the optional A2000 genlock slot adaptor kit, it also perfectly complements and enhances the A2000.***
***Check out these features, all packed on a single Amiga® expansion board!***



▶ **Separate Composite and Component Video (RGB+Sync) Genlocks.** RGB genlock operates in the digital domain, for digitally perfect production studio quality mixing: no color bleeding, no ghosting, no artifacts . . .!

▶ **1.5MB Frame Buffer.** Display 24-bit, 16 million color images on your Amiga monitor. On a multi-sync monitor, you can even display 16 million color images in non-interlaced mode!

▶ **Realtime Framegrabber/Digitizer.** Freeze, grab and store (in standard 4096 or 16 million color IFF format) any frame from a "live" incoming RGB video source. Optional "RGB splitter" required to grab incoming composite or S-VHS video.

▶ **Flicker-Eliminator.** Duplicates and enhances the A3000's display enhancer circuitry. It even de-interlaces live external video! A must for any A2000 owner. Ask about our A2000 "genlock slot trade-up" program (in case your genlock slot is already used by something less exciting!)



▶ **Simultaneous Component Video (RGB) Out, Composite Video Out and S-VHS Video Out.** Now, anything you can see on your Amiga monitor can be recorded on video tape,

## *Introducing the IMPACT VISION 24™ from GVP*

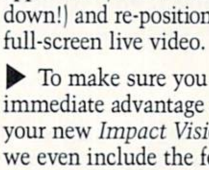
### *The All-In-One Video Peripheral for the A3000 and A2000*

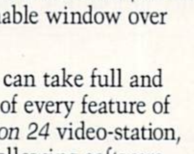
including animations, ray-traced 24-bit images and more!

▶ **Picture-In-Picture (PIP) Display.** Freeze, resize, rescale and/or reposition live incoming RGB video just like any workbench window at the double click of a mouse or the pressing of a "hot key". With a multi-sync all this can even be in rock steady de-interlaced mode. Unique "reverse-PIP" feature, even allows you to place a fully functional Amiga workbench (or other application) screen as a SCALE-ABLE (shrunk down!) and re-positionable window over full-screen live video.

▶ To make sure you can take full and immediate advantage of every feature of your new *Impact Vision 24* video-station, we even include the following software with every unit:

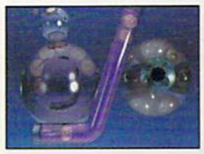
- **Caligari™-IV24.** An exclusive version of the leading broadcast quality, 3-D modelling and rendering program. Use your imagination to model 3D, 16 million color, scenes. Use your digitized video images as textures to wrap around any object! The mind is the limit!
- **SCALA™-Titling.** Easy-to-learn, video titling package complete with lots of special fonts and exciting special transition effects. Turn your Amiga into a character generator.
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creating or manipulating any 16 million color, 24-bit image.

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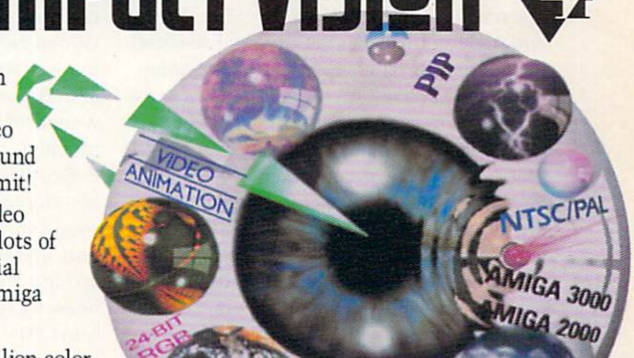


press a (configurable) "hot key" to activate any feature.

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## Island Unrest

It's 1995, and you're in charge of an American tank platoon. Can you rid Yama Yama's five islands of the North-Korean-backed, disaffected Soviet communists? The sequel to Team Yankee, **Pacific Islands** (***Empire/ReadySoft***, $49.95) tests your strategic prowess through more than 30 battles, each with multiple objectives. Only after all five strategically important islands are liberated can you call yourself a winner. (RS# 108.)



**Experience the not-so-distant future of tank warfare in Pacific Islands.**

## Inside Sync

Is there no more room for another black box in your video studio? Very well, just plug your time-base corrector into one of your Amiga's slots instead. Compatible with composite and S-VHS systems, the **TBCard** (***I.Den***, $995) promises a broadcast-quality signal, infinite-window time-base correction and synchronization from any video source, and a bandwidth of 5.5 MHz. For an additional $135, you can purchase the TB-Card/TR-7 combination. The TR-7 is a remote box that gives you control of proc-amp functions, field and frame freezes, and system-timing controls. (RS# 111.)

## Graphics To Go

Have you a need for ready-made graphics and special effects for wedding videos? **Animattes: Wedding Series** (39.95, ***Electric Crayon Studios***) is a point-and-click collection of self-running graphic routines offered on three disks. You can use the routines straight out of the package or customize them in an IFF paint program, utilizing the included modification tutorial as a guide. (RS# 105.)

## Encore, Encore!

They're back! **The Lost Treasures of Infocom**, a collection of 20 favorite bygone text and graphic adventures, is now available from ***Activision Studios***. For about $100, you'll receive all five Zorks, the mysteries Ballyhoo, Deadline, Moonmist, Suspect, and Witness; the science fiction games Hitchhiker's Guide to the Galaxy, Planetfall, Starcross, Stationfall, and Suspended; the fantasies Enchanter, Sorcerer, and Spellbreaker; Infidel, in which you must find the great lost pyramid of Egypt, and the creepy Lurking Horror. (RS# 106.)

## SIMply Learning

Suppose you were given the choice of learning addition by drill or by playing a game such as cribbage? That's an easy choice—and studies show that students learn and understand much more when they are having fun. In her article "Simulations and Adventure Games in Computer Assisted Language Learning" (Simulation & Gaming, Dec. 1990), Macey Taylor reports on a wide variety of games usage in both direct instruction and teacher training. She found that "...students in communicative classes have tended to progress more rapidly, scoring higher on our level tests...than their counterparts in more traditional courses."

Taylor uses Sim City (among other programs), and cites the wealth of educational possibilities it allows. These include site research, map making, planning and budget making (using spreadsheet and database programs), and writing.

In fact, teachers at all levels, from elementary school to college, from vocational schools to literacy and English as a Second Language instruction, are applying this concept with Amigas. With the help of simulations like Sim City (Maxix) and Balance of Power (Software Toolworks), students learn not only city planning and international relations, but also language and writing skills, math, traditional sciences and social studies. These and other simulations offer a wealth of possibilities for instruction and practice.

Scott Horan, teacher and proprietor of Mr. Horan's Computer Lab, a large Amiga establishment in Louisville, Kentucky, uses and installs Amiga educational systems around the South. In addition to simulations, he recommends Lemmings, especially in CDTV format, as "a great problem-solving game for classrooms."

"It's a microworld for higher-order thinking skills," he explains. "CDTV decentralizes the classroom. If the teacher is going to be the guide on the side instead of a sage on the stage, CDTV is the perfect tool."

Many commercial and public-domain games and simulations can be customized using one of the multimedia authoring languages such as AmigaVision, CanDo, or The Director. The tools are readily available; it's up to teachers to use them to spark the creativity and imagination that students at all levels bring to the learning experience.

*—Michael Hanish*



### *OVERHEARD*

Commodore wants to pay you $500! If you purchase an Amiga 3000-25/50 or 3000-25/1000 before April 30, Commodore will give you a $500 rebate. You may either apply it to your purchase immediately or receive a check from Commodore. For full details, call 800/66-AMIGA.

## Video Flippers

NORTH MANITOU ISLAND, Michigan—In the tradition of legendary explorer Jacques Cousteau, scientists from Michigan-based Great Lakes Visual Research (GLVR) took the plunge off the coast of Lake Michigan's North Manitou Island. Using a Sony video camera housed in a specially-made casing, these fresh-water explorers surveyed and recorded a visit to the sunken Alva Bradley, lost nearly 100 years ago.

According to GLVR's Harley Seeley, who coordinated the expedition, an A2000 equipped with a GVP accelerator

*Continued on p. 14.*

# GVP Enters the SOUND ZONE

*Hardware now Enhanced!*

*★ NEW: Software Programmable Volume Control*

*★ NEW: Software Controllable Filter*

*With the most powerful, comprehensive 8-bit Digital Sound Package to ever orchestrate an Amiga*

## Digital Sound Studio

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## Record, Edit, Compose . . .

***With a high-quality stereo sound sampler, A fast, powerful, easy-to-use sound editor, And a self-contained 4-track sequencer.***

**For all the sound effects and music you could ever imagine.**

▶ **Record** sound samples from any source, including voices, noise, and pre-recorded instruments, to create your own instruments and effects.

▶ **Edit** sounds quickly in real time. Add effects like reverb and echo, run sounds backward, alter wave forms, cut and paste sound segments, create loops, eliminate pops and scratches.

▶ **Compose** easily using the DSS 4-track sequencer and your Amiga or MIDI keyboard. Draw from up to 31 instruments at a time, in up to four octaves with 8 different variable effects. Mix and modify sounds in real time as you compose, through direct interface with the sound editor.

**DSS Stretches the outer limits of 8-bit sound**

- Create your own 4-track, self-playing musical compositions.
- Make soundtracks for home video, animation or visual presentations complete with voice-over, sound effects and music.
- Analyze voice patterns and stereo separation.
- Analyze graphic equalization of real-time sound.
- Remove "pops" from old phonograph recordings.
- Create custom instruments and sound effects by collecting and/or modifying pre-recorded instruments, voice, or sounds from any source, and use them in your own compositions.
- Save your sound and music to disk or send it out via modem for replay on any Amiga.





**Check out these unparalleled features**

✓ AmigaDOS 2.0 compatible; written in assembly language.

✓ Multi-tasking operation.

✓ 68020 and 68030 compatible.

✓ Comprehensive tutorial manual helps even beginners get started right away.

✓ Intuition-based graphic interface makes operation easy.

✓ MIDI-in capability.

✓ Direct interface between sequencer and editor.

✓ Hold 31 sound samples in memory at once – all shown on screen so they are easy to manipulate.

✓ Effects and processing capabilities include echo, mix, filter, re-sample, sound data inversion, playing sounds backwards, loops, fade-in/fade-out and more.

✓ Manipulate sound samples in real time, as you listen.

✓ Create sampled instruments with 1, 3 and 5 octaves.

✓ HIFI recording for highest quality playback.

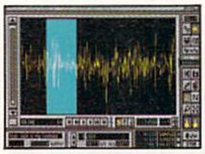
✓ Controls for faster/slower playback and filtering high frequencies during playback.

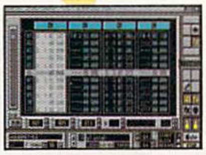
✓ Load and save samples, songs and instruments in multiple formats.

✓ Multiple effects for each note.

✓ Stereo and monophonic operation. Also convert mono to stereo or separate stereo.

✓ Auto-playing music modules.





✓ Real-time oscilloscope and spectrum analysis.

✓ Real-time reverberation.

✓ Graphic editing of wave forms through easy-to-use functions, including zoom in/out and precision controls for position, frequency and amplitude.

✓ Draw sound waves freehand using the mouse.

✓ Direct editing of individual sample numeric values.

✓ Maximum recording speed of 51,000 samples/second in stereo.

✓ Savable Preference settings.

✓ Saves in IFF, SONIX or RAW formats.

✓ Compatible with SoundTracker, NoiseTracker and SoundFX modules.

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*AmiEXPO, from p. 8.*
is also planning a series of Amiga **CD-ROM products**, including a public-domain software collection, clip art, and a picture disc. Each disc is expected to sell for $79.95. (RS# 127.)

Going back to the future, the ***GEnie*** telecommunications service is planning to introduce an on-line **interactive Amiga "magazine"** that will eventually include sound, graphics, and animation. (RS# 128.)

***Mach Universe*** entered the 3-D object fray with the $49.95 **Big Rig**, a tractor-trailer object set that's compatible with LightWave 3D. The truck can be easily animated, with headlights, blinkers, rear view mirror, and 18 moving wheels. (RS# 129.)

Besides wowing us with its **Resolver** graphics board, ***Digital Micronics*** offered a **20MB, 3.5-inch floppy drive**. Yes, floppy! The firm claims an average access time of 65MB per second, which equals the performance of many hard drives sold only a few years ago. Prices range from $549 for an internal unit to $749 for an A500 version that includes a SCSI controller. (RS# 130.)

**In the Can**, a European titling-and-effects product, has crossed the Atlantic and is selling for $99 from ***Visual FX***. (RS# 131.)

Finally, promotor ***AmiEXPO*** (RS# 132) announced its move into the desktop-video market with its first such show, Desktop Video '92, scheduled for May 21–23 at the Hyatt Regency, San Francisco Airport. It has also scheduled another AmiEXPO for October 2–4 at the Marriott Marquis in New York City.

*—Doug Barney*

*PC Connection, from p. 8.*
from the Bridgeboard if you use Consultron-style PC virtual hard-drive partitions. In addition, with the Ambassador you can access Bridgeboard-created virtual partitions and most real MS-DOS hard-drive partitions connected to the Amiga. (RS# 113.)

A Bridgeboard alternative for the A500, **ATonce-Plus** (***Vortex/MicroPace***, $448) features a 16-MHz CMOS 80286 processor and 512K of RAM, plus a socket for an optional 80C287-12 math coprocessor. Tested under MS-DOS versions 3.2 to 5.0 and DR-DOS 5.0 and 6.0, the board runs unrestrictedly in Protected mode (Windows 3.0 and Lotus 123 are supported, however) and offers 640K of memory for DOS functions.

In machines with one meg or more of RAM, ATonce Plus lets you either install additional program memory or a RAM disk. For its display, the board emulates 16-color CGA mode, one EGA/VGA monochrome graphics mode, and the Hercules, Olivetti, and Toshiba T3100 graphics cards. While you can use the Amiga's serial port as COM1 or COM2 with the card, the parallel port maps to LPT1. Sound and a real-time clock round out the features list. (RS# 114.)

For PC-XT emulation without hardware, ***Consultron***'s **CrossPC** is the answer. This software emulator is bundled with an upgrade of CrossDOS in CrossDOS version 5.0 Plus. Requiring one megabyte of RAM and version 3.0 or higher of MS-DOS, CrossPC emulates CGA or monochrome video modes and can access standard Amiga floppy drives, an MS-DOS partition on an Amiga hard disk, and the Amiga's parallel, serial, and mouse ports. The other half of the team, CrossDOS 5.0 now supports 1.44MB high-density disks and the 20MB MS-DOS floptical disk format.

Associated utilities, error-recovery techniques, and the user interface were revamped, as well. For example, the format and disk-copy commands now operate on both MS-DOS and AmigaDOS disks. As a new product, CrossDOS version 5.0 Plus is available for $59.95; as an upgrade, the cost is $20 and an original CrossDOS disk. Consultron also sells **MS-DOS 5.0** for $90. (RS# 115.)

*Video Flippers, from p. 12.*
and a Video Toaster (NewTek) made the underwater imaging easy and effective.

Normally, it takes a lot of work, both in the field and in post-production—possibly up to two years—to establish records like these. With the Amiga setup, Seeley said, image acquisition can be done rapidly and with good resolution. The system allowed Seeley to accomplish both his goals: charting underwater preserves and furthering the concept of a rapid-deployment, mobile system that is consumer-oriented and inexpensive.

"You don't need to be a computer scientist to use this system," Seeley explained. "(Its) major advantage is that the available software allows you to adjust the contrast and change the scale (of images)." Avocational archaeologists will be interested to know that the entire setup costs less than $10,000.

*—Rick Broida*

## Add More Than Four

Users of Commodore's A2630 accelerator can now have more 32-bit room to maneuver in, thanks to the **DKB 2632** (***DKB Software***). The DKB 2632 is a 32-bit memory-expansion board that installs on the A2630. While it comes populated with four ($699.95) or eight megabytes, you can expand the board up to 112 megabytes in increments of 1, 2, 4, 8, 16, or 32 megs using JEDEC-standard 32-bit-wide SIMM modules. Because this RAM uses 32-bit address space instead of autoconfig space, you can install it and still use an AT Bridgeboard with more than six megs of fast RAM. The DKB 2632 is also 2.0-compatible and is backed by a one-year warranty. (RS# 109.)



**The DKB 2632 offers up to 112MB of 32-bit RAM to A2630 owners.**

*Toolbox, from p. 10.*
message strings used by QVCS utilities, a file-compare utility for binary and ASCII files, accidental-deletion protection, and the ability to automatically expand key words. (RS# 102.)

If debugging your SAS/C code is a bigger concern than cataloging it, consider **MultiTrace 1.0** (***AltoFirma Software***, $89), a multitasking debugger housed in a link library. With it, you may open separate trace windows for each program or task running, pause and step through individual tasks, and change a program's or task's execution speed.

MultiTrace supplies feedback on these tasks in several ways: It displays messages and variables in trace windows with printf syntax, displays hex dumps of memory or string data, and lets you restrict trace reporting to specific function-call levels. The included MakeTrace utility creates header files and generates C-function prototypes. (RS# 103.) ■

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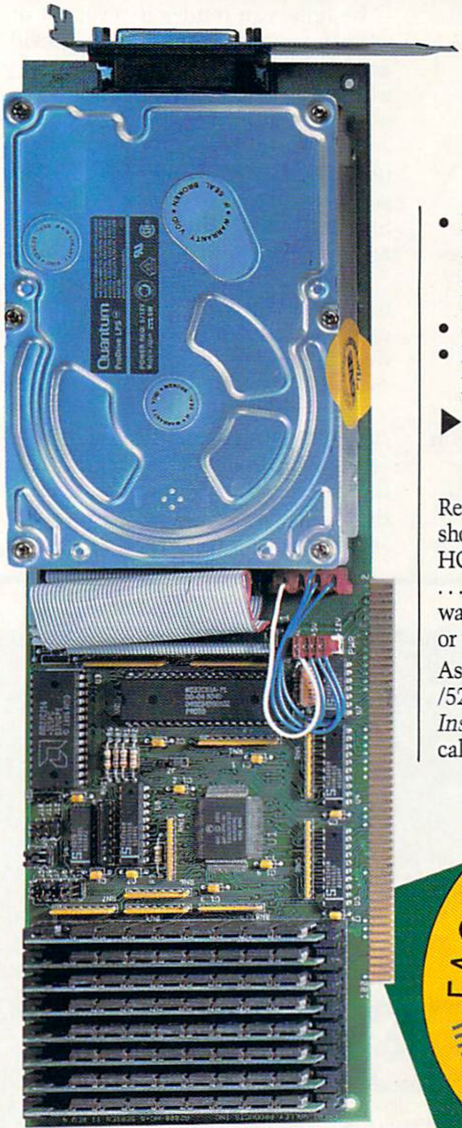
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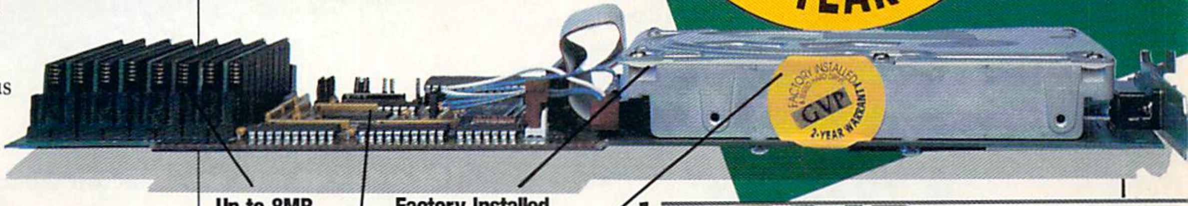


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## *AW* Shucks!

*We correct our errors.*

*Item:* Due to problems in the fact-checking process, our Special Issue on Video & Animation contained several errors regarding Impulse's Firecracker board and Imagine software. In the chart on p. 82, the following corrections regarding Firecracker 24 apply: The list price is $1000; its maximum resolution is 1024 by 482, not 768 by 480, as stated; and it is not available in PAL.

With regard to Imagine 2.0, a number of errors were made in our 3-D software features chart on pages 110–111. First of all, Imagine supports solid spheres, has full 3-D spline control, handles full 3-D remapping and conformation, and includes full extrusion and spin capabilities.

Regarding the category of Polygon Divides, Imagine has triangle fracture, and, under Slice Operation, it has full Slicing. The program also has full grouping of Hierarchical Objects Sets and includes a full implementation of Key Positions.

With respect to Time Envelopes, Imagine directly equates this to frame numbers and time notation in its Stage and Action editors.

Imagine can render in a variety of ways not covered in the chart, including Wireframe, color and black and white, solid color and black and white, Scanline, and Full Trace.

The program's maximum resolution is 32,000 by 32,000, it fully supports Diffuse Map and Phong Shading, and it supports Full Glass and Index of Refraction.

The product does not map Anims to objects, nor does it directly support Single-Frame Controllers. It also does not support Foreground Pics or Antialias Maps.

*Item:* The Amiga Profile on p. 68 of our Special Issue incorrectly implied that Derek Grime was the creator of the show "Clarissa Explains It All." "Clarissa" is, in fact, the creation of Mitchell Kriegman. Derek, along with his fellow animator/writer, Tim Burns, was involved only to the extent of providing the Amiga animations for last season's episodes.

*Item:* Gene Brawn's February tutorial article on DPaint IV (p. 24) contained an error that made his project #1 impossible to reproduce. Two of the three picture files were misnamed. The images identified in the article as *Godz.ab* and *LookingUp.ab* are, in fact, *Godz&Ted.ab* and *LookingUp.anim*, respectively. Gene regrets to say that he used the former names in his work files and then neglected to correct the discrepancy in the final version of the article.

*Item:* In the March issue, our Manufacturers' Addresses list (p. 89) contained errors in the entry for IMAGETECTS. Not only should the firm's name be all uppercase, but the correct street address is 7200 Bollinger Rd., Suite 802. ■

# REVIE

## IMAGINE 2.0

**IMPULSE**

## REAL3D PROFESSIONAL TURBO 1.4.1

**ACTIVA INTERNATIONAL/ PROGRAMS PLUS & VIDEO**

*A pair of professionals.*

**By Steven Blaize**

SOPHISTICATED COMPUTER ART and animation are becoming more popular with the release of movies such as Terminator 2 and music videos like Michael Jackson's "Black or White." As the awareness and demand rises, so do the expectations. This trend is very apparent in the Amiga market, where the quality levels expected and techniques used by artists are growing daily.

New versions of two 3-D programs have definitely kept pace with this demand for higher quality and more techniques. **Imagine 2.0** ($450, ***Impulse***) and **Real3D Professional Turbo 1.4.1** ($499, ***Activa International/Programs Plus & Video***) are two top contenders in the 3-D arena. Because both these fine programs are updates of earlier versions, I will concentrate on highlighting the new additions and significant functions of each, rather than cataloging every feature.

### MATURE PRODUCTIVITY: IMAGINE 2.0

Released at the end of last year, Imagine 2.0 is a maturing 3-D graphics package. Thanks to its reasonable cost, excellent functionality, and top-notch renderings, Imagine (originally the follow-up to the popular Turbo Silver) has built a large following. You won't be disappointed by version 2.0, with its additional features, new manual, and easier ways to be productive within your 3-D world.

Imagine is one program divided into seven editor areas. New in 2.0, the Preferences Editor lets you directly edit and customize your preferences. With it, you can add to the bottom of the other editors user-customized gadgets (buttons) that control frequently used functions. This speeds up productivity. With the Forms Editor, you create organic or symmetrical objects, while with the Detail Editor, you build new objects, modify Forms objects, and assign all surface characteristics to objects.

The Stage Editor lets you set object and camera placement, lighting, and viewing perspective. In the Action Editor, you specify movements, global parameters, and, if you are animating, key cels and special effects over time. A potential time-saver, the Cycle Editor lets you create repeating or hierarchical movements for objects. The classic example is walking: If you create the Cycle movement for one full step, you can then repeat this cycle in the Action Editor over an assigned time period. Finally, the Project Editor generates animations and controls rendering selections, such as resolution and format.

In the Forms Editor, you begin with a sphere that is cut into slices, the shapes of which you then alter to create your object. The 2.0 addition of key slices was critical in making this editor useful. Instead of shaping every single slice, you can specify one or more key slices, alter their shapes, and let Imagine provide smooth interpolation between them.

Consider an automobile body with a ridge that runs only from the front door to the back fender: If you cut the body into cross-sections from front to back, the first section (grill area) would be a rectangle, and the section that starts at the door would be a rectangle with ridges on either side. Designate this section a key slice, and Imagine will produce a smooth ridge down the length of the car.

**To locate the vendors of products reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 84.**

Want to check the results? The Forms, Detail, Cycle, and Stage Editors now have Quick Render options that let you render directly in the editors without having to set up all of the staging and lights—another welcome productivity enhancement.

The Detail Editor's improvements will make many people happy. Now, when you convert an IFF file to an object, you are asked whether or not you want faces on the object. You can also type in text using standard Amiga fonts and have it converted to a 3-D object. This alone will save a great deal of time, although the conversion is not as powerful and flexible as that offered by dedicated programs such as Pixel 3D 2.0 (Axiom Software).

In the past, getting brush (IFF picture) wraps and texture wraps in exactly the right place was possible, but difficult. Now, Imagine automatically gives you a default position and texture parameters. You can still customize these, but you will at least be assured of a good starting point. Version 2.0 offers several new textures to wrap, as well. Checks2, Pastella, and Waves bring the number of textures to 14.

Another important attribute-enhancement addition is Fog Length. Now, any object can have fog properties (in any of the 16.7 million colors), and global fog has been added to the Action Editor. Spline paths have also been included for object extrusions, and Conform to Path has been added.

Also new to the Detail Editor is the ability to define subobjects—a group of faces within an object. Now you can selectively apply any of the Brush or Texture Maps (four each) to just a subobject, making decals very easy to produce. You can also use subobjects to selectively control Phong shading. Objects in Imagine are composed of

W S

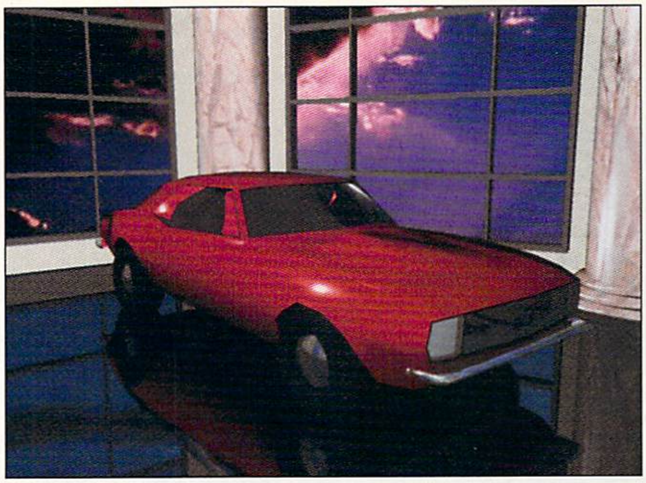


Figure 1. Imagine 2.0 lets you use global backdrop pictures, such as these clouds.

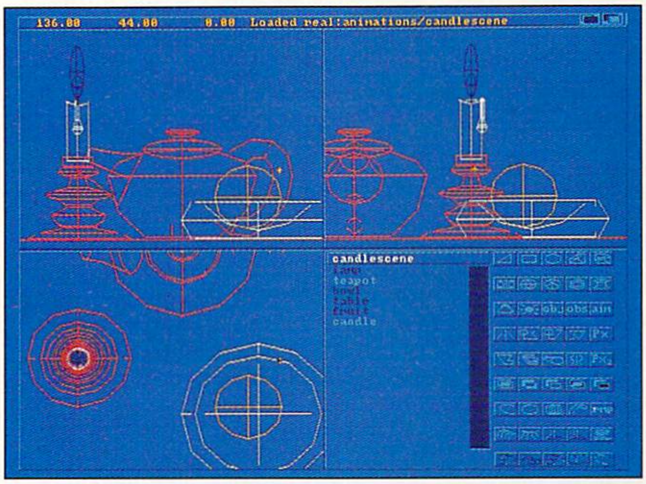



Figure 2. Real3D's free-form modeling mode gives you commands for bending, joining, and twisting objects in 24 ways.

triangles, and the program uses Phong shading to help smooth the surfaces of rounded areas. Prior to 2.0, achieving sharp edges on one part of the object and smooth ones on another was almost impossible. Now you can define the points that will not have Phong shading, while the rest of the object is smoothed out.

New to Imagine 1.1's Detail Editor was Quick Draw, which changes the objects in your display to simple bounding boxes. This is very helpful when you have complex objects, because Imagine can update your display much more quickly if it draws only a bounding box in place of a point-filled object. In version 2.0, Quick Draw was added to the Stage Editor, as well. Now you can load your complex objects, and then turn on Quick Draw for faster manipulations. Your Perspective View is always updated with the proper display.

In 2.0, the Action Editor is basically the same as in earlier versions, with the addition of a Sort function from the menu for your objects and a second F/X action line. F/X, one of my favorite features in this program, now includes Boing, Explode, Fireworks, Flash, Grow, Ripple, Rotate, and Tumble. You can even apply two different effects on an object at the same time. You can also have a global backdrop picture, as I did with the clouds in Figure 1.

The Cycle Editor is relatively unchanged, as is the Projects Editor. From the latter, however, you can now output directly to DCTV format.

The last area to cover is the documentation. The reputation for producing inadequate manuals has always haunted Impulse. The company has developed outstanding products, but has accompanied them with lackluster documentation. The manual for Imagine 2.0 is definitely a complete rewrite. It takes a different and unusual approach, in that you are expected to read it from start to finish.

It reads like a story about creating with Imagine. The sparse index—located before the single tutorial—and other appendices do not really direct you to specific subjects, however, but rather send you to pages where the phrases are mentioned. The misspellings and comments such as "Ask Zack For More Here" indicate that the manual was a little rushed. However, the program is more thoroughly covered than in previous versions. Should you need it, technical support is available free of charge.

### Powerful Flexibility: Real3D Professional Turbo 1.4.1

Real3D Professional Turbo, while not the new kid on the block, is one of the newest professional-level 3-D programs for the Amiga. Version 1.4.1 makes it a definite contender for your consideration. Real3D takes a very different approach with its interface and object creation, but, once mastered, the techniques produce outstanding results, with options not always found in other 3-D programs.

The program has three basic working areas: the Editor, Wire, and Solid. The Editor is your object-creation and staging area for a specific frame. The Wire area lets you move about your space and record animation movements for your objects. Finally, the Solid (or Render) area controls the quality, format, and resolution of your rendered images.

When I looked at the first release of this program, I was impressed with both the speed and quality of the renderings, but found object creation and animation seriously hampered. Version 1.4.1 has improved both immensely. It employs a hierarchical structure for object creation. For example, a chair is made of the legs, the seat, and the back. In turn, it is part of the dining-table set, which is part of the room, and so on. By selecting any group level, you can alter it and all of its related parts. A unique feature is the ability to identify a cost with a specific object. At any time, you can see the cumulative cost at any stage in the construction of your object.

When it first appeared, Real3D provided object creation only by means of a few primitives and tools to modify them. Now the program provides a wealth of primitives, along with excellent tools such as Lathe, Polygon, Polyhedron, and Conical Tube. An unusual one is the Pixel tool, which replaces pixels in an IFF picture with a specified ►

YOUR TURN:

Imagine 2.0 is a big improvement over previous incarnations, especially in the documentation and interface. Still, the documentation is more of a tutorial than a reference, and, as always, the edit screens are limited to 640x400 resolution, which is frustrating for those of us who typically use overscan screens.

***Kent Kalnasy***
*Seattle, Washington*

object. For example, if you drew a title in a paint program, you could replace each pixel with a sphere and build a title composed of balloons.

Another tool, Pixel2, creates a mesh over an IFF picture to generate a topographical landscape, with increasing brightness of color indicating increasing elevation. This type of object creation is fine for some things; however, many of us want point editing to design custom objects. Version 1.4.1 gives us that, too.

Real3D also has some of the most powerful Boolean operators in any 3-D program. You can use these to cut away sections of objects, using any object as the tool for cutting or adding. Best of all, you can use the tool to apply its attributes to the new object. With a gold cylinder, for instance, you could drill a gold hole through a wooden ball and even animate the process. The problem with this method of creation is that the two objects are still completely displayed in the Editor and the wireframe view. This can become very confusing with complex objects. A new feature helps: You can now have Real3D "rethink" to provide you with a better wireframe representation. You also have the ability to attach and modify a different wireframe to the object if it will assist your work.

The free-form modeling is very powerful, offering 24 ways to bend, join, and twist objects. Tools and primitives are available from menus, keyboard commands, and icons (see Figure 2). Lights and refractive properties in Real3D react exactly as they do in the universe; for example, you can create an actual glass lens. Real3D also permits you to create custom materials libraries for controlling the surface properties of your objects. A very useful feature is the ability to select objects based on color, properties, or name. These can then be altered in one global change. The program now supports 24-bit brush maps, which is very important to many of us.

The Solid (render) screen provides many methods for rendering your image, and it gives you controls for automatic lighting, shadow inclusion, refractive depth, and so on. The full ray-traced output takes about the same length of time to render as in other programs, but the results are outstanding. You can output your work as an Amiga, 24-bit IFF, or Targa image. Real3D also supports some full-color display boards, with libraries (such as DCTV) that will be added through the public domain; current libraries include the Harlequin and VD2001 boards.

Animation is still a little awkward in Real3D 1.4.1. The program does support key frames, and it allows movement along a spline path. Adding acceleration and deceleration of objects, however, takes a bit of work. In addition, the method used for key frames is to "Expose" a frame to certain positions. If you want to change an object in that frame, you must first "De-Expose" it.

The manual is well written; the information, however, is sparse, and a lot about the program is presumed to be intuitive. For example, adding primitives requires different steps to define the starting points, diameters, and so on, but these are never explained. Furthermore, the reference section is far from a thorough explanation of each of the commands. Overall, though, I feel the manual provides coverage that's adequate to get you started. While it was developed by The Netherlands' Activa International, Real3D Professional Turbo is supported by Programs Plus & Video in North America via telephone or BBS, if you need technical help.

### The Best Fit for the Job

If you are a 3-D artist, you should consider adding one or both of these programs to your toolbox. Neither is a clear winner over the other, as each offers features the other does not. While Imagine excels at point editing and is a much better animator, Real3D offers unique Boolean functions, more output options, and somewhat better-looking output quality. Both Imagine 2.0 and Real3D Professional Turbo 1.4.1 are very well suited to produce professional results, so you can't very well go wrong.

## DSS8: Digital Sound Studio

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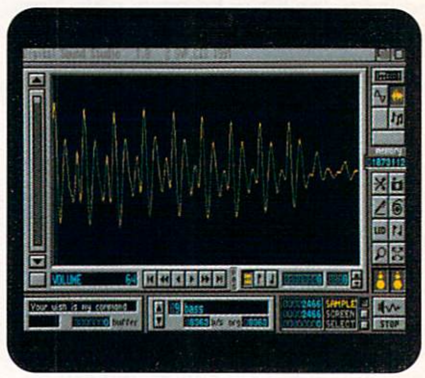
**By Steve Quinzi**

A COMBINATION SOFTWARE and hardware package, **DSS8: Digital Sound Studio** (***Great Valley Products***, $125) utilizes the Amiga's internal audio capabilities to provide an environment for stereo sampling, sample editing, and sequencing Amiga-specific sounds.

When DSS boots, it opens with a system-information screen that displays details about your current system, such as the version of DSS that you're running, the microprocessor that you have, and the amount of available chip and fast RAM. Click twice, and this screen becomes the DSS samples list, although you can summon the system information display at any time by selecting Info from the Project menu.

### Try a Sample

The samples list consists of 31 slots into which samples can be loaded.

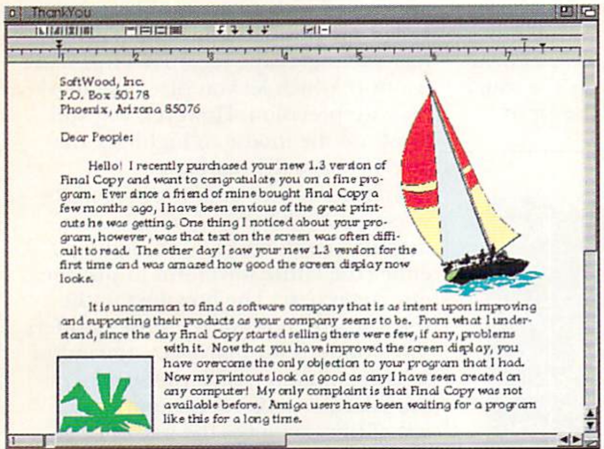


**Digital Sound Studio's sample editor gives you precise control over your sound.**

Obviously, the number of samples you can actually have at one time is limited by the amount of available RAM. To the left of each sample in the list is a small box indicating if the sample is stereo, less than 128K, and currently residing in chip or fast RAM (more about this later). Arrows at the bottom of the screen let you move up and down the sample list.

To work with a sample, you must first select it with a mouse click. The box at the base of the screen displays the name of the selected sample, its current frequency (in bytes per second), ►

# NO BRAG, JUST FACTS!

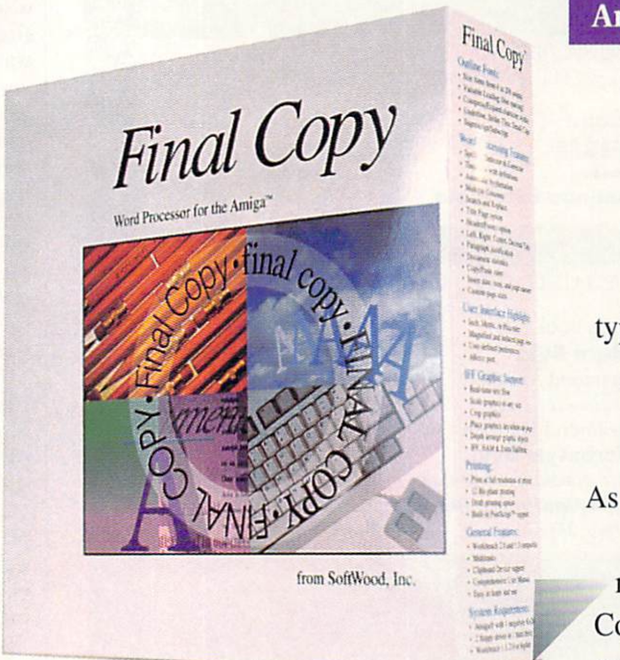



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|---|---|---|---|---|---|---|---|---|
| Final Copy 1.3 | 35 | Yes | 3.5 sec. | 470,000 | 116,000 | 1-6 | Yes | Yes |
| ProWrite 3.2® | 0 | No | 1 min 20 sec | 300,000 | 100,000 | 1-5 | No | No |

| Comparison Chart | Price | Frame Graphics | 24 Bit ILBM Support | Thes. with Definitions | Page Views | Print 1 pg. Document | ARexx | Use Amiga Clipboard |
|---|---|---|---|---|---|---|---|---|
| Final Copy 1.3 | $99.95 | Yes | Yes | Yes | 25-400% | 53 sec. | Yes | Yes |
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and its original frequency. The multifunction slider at the left can vary either the sound's volume or frequency. To hear the current sample, just click the speaker icon in the lower-left corner of the screen.

DSS offers some interesting features for changing samples from mono to stereo and vice versa: Create Stereo combines two mono samples to form a single stereo sample, while Divide Stereo separates the right and left channels of a stereo sample to individual mono samples. Convert to Stereo contrives stereo by duplicating a mono sample and assigning the two samples to left and right channels of a stereo sample (this is actually not stereo but "multi-mono"). Convert to Mono sums the two sides of a stereo sample to mono.

Double click on any sample, and you enter DSS's Sample Edit mode, where the waveform is displayed graphically. If the sample is stereo, both waveforms appear. The Edit menu offers the usual cut, copy, and paste, while the Swap Channels command produces some nice stereo "ping-pong" effects.

Most of the editing features require that you define a range before using them. The obvious way to do this is by highlighting the desired area of the waveform with the mouse, but you can also use the position markers. These are moved with an array of buttons called the position-adjustment arrows (resembling a tape recorder's transport control), which let you place the markers with precision. However, you still must use the mouse to highlight the area between the markers.

Another way to define a range is by selecting Auto Range from the Edit menu; from there, you can highlight either the entire waveform or just the on-screen part. The box next to the speaker icon now makes sense; it offers three options for playback—the entire sample, whatever is on the screen, or the selected range. A readout to the left of this box gives the size of each option.

The Process menu's functions are also designed to work within a specified range. The first option here, Backward, plays the selected range in reverse. Inverse changes every amplitude value within a range to its inverse (for example, 1 becomes -1). The waveform sounds the same, though it is now 180 degrees out of phase from the original; if you play the two waveforms together, they cancel each other out. Set to Zero sets all amplitude values within the specified range to zero, which is useful for inserting periods of silence into a waveform.

Ramp Volume creates percentage changes in amplitude from the beginning to the end of a range. For example, setting the start value to 100% and the end value to zero produces a fade-out. You can use Ramp Volume to produce uniform level changes, as well, by setting the start and end values the same (a value above 100% increases the overall level, below 100% decreases it).

Echo repeats a range to create an echo effect; you can control the echo rate, rate of decay, and the number of echoes (limited by the length of the sample). With the Mix feature, you can merge a range with whatever is currently in the RAM buffer, and you can resample a range to a different (presumably lower) sample rate to conserve memory.

Clicking the loop button in the control panel at the right of the screen activates the loop mode. To specify the section you wish to repeat, place the ►

# Welcome to the Future.

## Soft-Logik would like to congratulate Gold Disk on adding features to Pro Page 3.0. Of course, it still doesn't compare to PageStream 2.2, the Experts' Choice.

Congratulations, Gold Disk, on adding improved typographic precision and an Undo option to Professional Page 3.0. Of course, PageStream has had Undo since version 1.0 and its type scaling is still 12.5 times more precise. The five new AGFA Compugraphic fonts included in ProPage 3.0 bring your total to 7, still short of the 10 we give our users.

We're sure ProPage users will appreciate the new ProWrite and Excellence text import filters; PageStream users have been enjoying them for years. And the tiling feature you've added in 3.0 will allow your users to make those banners and posters PageStream users have been pasting on walls everywhere.

The most impressive feature in 3.0 has to be the links to ProDraw and Article Editor. Your "hotlinking" feature is a closed and proprietary system. Our HotLinks is a standard protocol which any company can support. Of course, this isn't really a fair comparison, because ProPage's links cannot match HotLinks' automatic data transfer, real-time multiple edition updating, and edition management utilities.

### Cool Programs for a Hot Computer

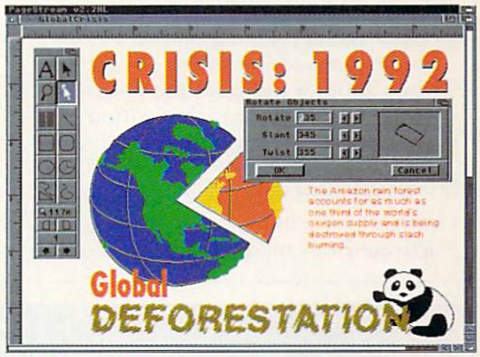
Soft-Logik Publishing is proud to announce HotLinks Editions. HotLinks Editions combines BME, PageLiner and HotLinks into an affordable package. BME is a bitmap editor for touching up pictures and photographs. PageLiner is a feature-laden text processor with spell checking and formatting tags. HotLinks is the new Amiga standard for data exchange.

### Multitasking is Cool, but HotLinks is Hot

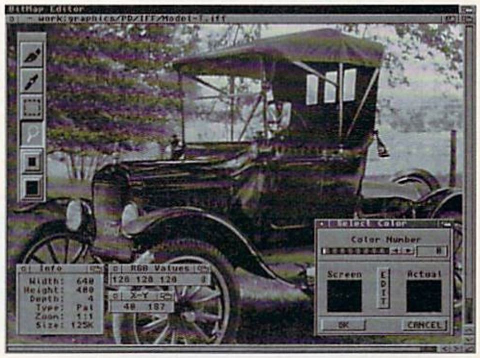
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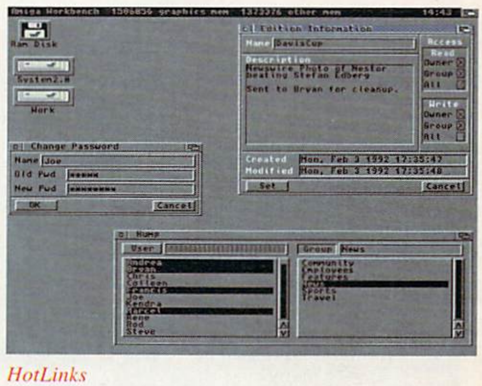
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loop markers with the mouse, and then fine-tune them with the position-adjustment arrows. One readout below the lower-left corner of the waveform display gives the loop marker's position (expressed in time or by address), while another indicates the instantaneous amplitude at each position (useful for searching for points of zero crossing).

If you need to tweak a waveform, switch to maximum magnification and activate Draw mode. Here you can use the mouse to make repairs. There are three drawing options: free drawing (hold down the left mouse button), straight-line drawing (hold down both buttons), and value entry (use the two arrows by the amplitude readout to enter a precise amplitude value at every position).

You can capture fresh samples, as well. First, plug the supplied audio digitizer into the parallel port (after turning off the Amiga), and then click the Sampler button to activate sample capture mode. (The DSS digitizer is a well-made, attractive black box with two RCA audio-input jacks, each one equipped with an attenuator knob and an overload light.)

The first screen to open lets you set various parameters. Here, you select the input (right, left, or stereo), choose one of three scales of oscilloscope displays or the spectral analyzer (an animated bar graph showing frequency ranges) to monitor incoming signals, set the sample length, rate, period, and root note, and you're ready to record.

Click the monitor button, and the incoming waveform is displayed according to your choice. You can also adjust the display's resolution to take advantage of the power of accelerated Amigas. Once the digitizer levels are properly set, click the record button to digitize the waveform. While the program offers a real-time reverb function that can be encoded upon the sample on input, I don't see the point in it. In my opinion, reverb is much more useful as an after-the-fact processing function.

### Make Tracks

The sequencer portion of DSS, the Tracker, works exclusively with Amiga sounds, specifically those that are loaded into the DSS samples list. For the Tracker to use a sound, it must be mono, less than 128K (256K if it contains a loop), and resident in chip RAM. The Edit menu's Transfer to Chip command moves sounds for you, but you need to keep track of your available RAM.

The Tracker's four tracks correspond to the Amiga's four audio channels. Above each is an on/off switch, or you can use two switches in the control panel at the right of the screen to toggle the left and right audio outputs independently (the outer tracks are assigned to the left side and the inner to the right). Two small readouts with adjustment arrows can set the volume of each individual sound, as well as that of the entire mix.

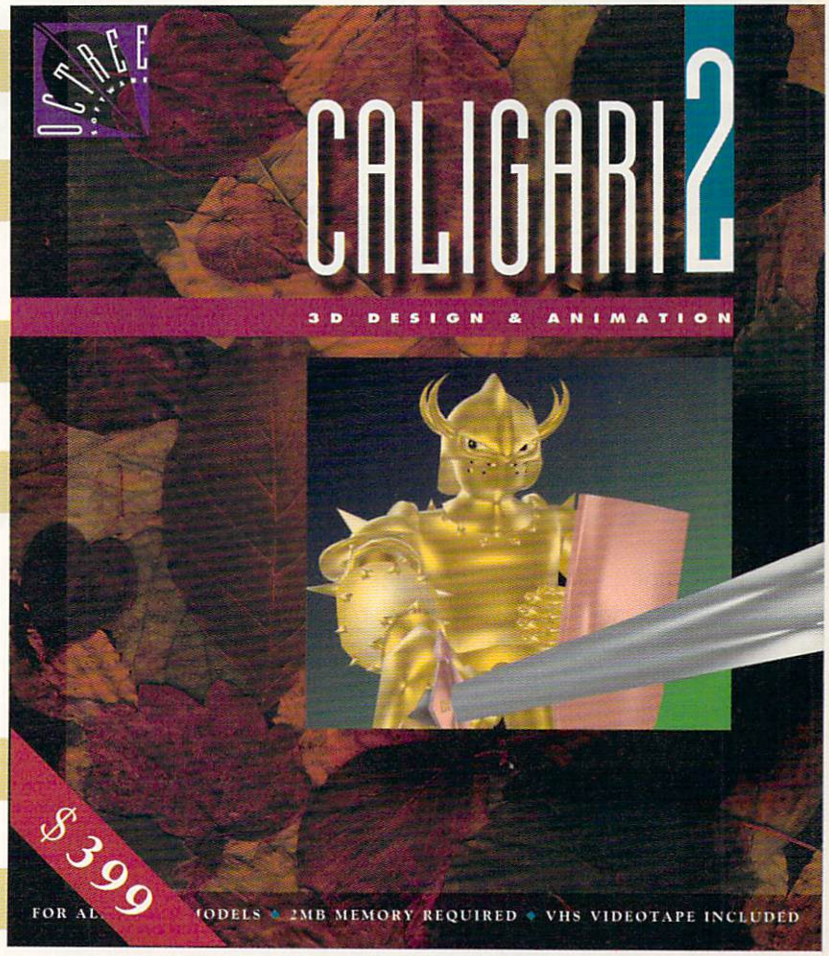
To enter data into the Tracker, highlight the track onto which you want to record, select the appropriate sound, and type notes from the Amiga's QWERTY keyboard. A small keyboard icon on the left toggles the range of the keyboard from the upper two octaves to the lower two octaves to accommodate a four-octave range.

You can also enter notes from a MIDI keyboard—the program's only MIDI aspect, by the way. This setup was apparently designed for moderate- ►

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ly slow (step time) note entry, evidenced by the fact that rapid noodling from a MIDI keyboard will produce some crazy, but not permanent, results.

The Tracker takes the building-block approach to song construction: You have a maximum of 128 "blocks" to work with, each consisting of 64 events. There is no provision for measures or time signatures; in fact, there is little reference to musical fundamentals at all. If this disturbs you, you could make up a chart mapping event numbers to measure and beat numbers. Given an eighth-note subdivision for example, a block would be eight measures in length (at 4/4 time), and the downbeats would fall on event numbers 1, 9, 17, and so on, while in a sixteenth-note subdivision, a block would be four measures in length, with downbeats on event numbers 1, 17, 33, and 49. Of course, you have to adjust the tempo accordingly.

Not surprisingly, the Tracker has a very nonstandard means of setting tempo—a scale from 1 to 15, with 15 being the slowest. You assemble blocks into a song by arranging a sequence of positions, assigning a block to each position. For example, assigning block 1 to positions 1 and 2, and block 2 to position 3 would result in block 1 playing twice, followed by block 2. If you need a block that is shorter than 64 events, there is a provision to jump out of a block at any point.

As far as global editing goes, you can cut, copy, and paste either tracks or blocks. Microscopic editing is limited to using the delete key to erase individual notes, while the Fill Track command places single notes at specified intervals in a track. Two transpose functions, called Note Up and Note Down, move a track, a block, or the entire song up or down a half step. The Tracker also offers a few "effects" such as Pitch up, Pitch Down, and Shazam (a rapid up-and-down pitch change). These are applied to individual notes with the degree of effectiveness expressed in hex.

When a song is complete, you can save it as a song (solely note data), a module (both notes and instruments), or a run module (a stand-alone module that plays, without DSS, from an icon or the CLI). You can also save your instrument setup independently from the song. While the sample editor can save sounds in either IFF, Sonix, or Raw format, the Tracker is limited to IFF.

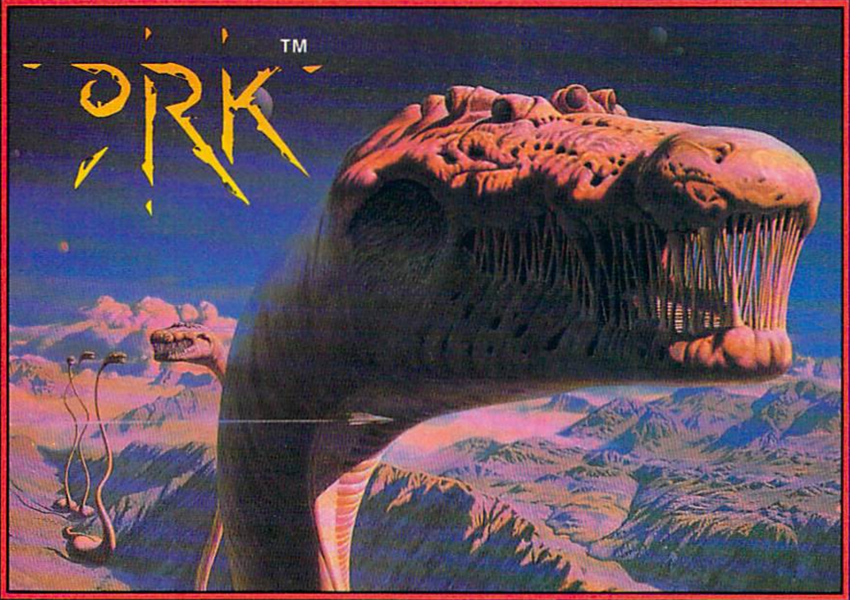
### Applause, but Not a Standing Ovation

With respect to its strength as a program, DSS gets high marks. It is smooth, easy to use, and intelligently laid out. The sampler and sample editor portions get the job done nicely, and I got some excellent results using GVP's audio digitizer.

The Tracker, however, is a different story. I would have been impressed by it seven or eight years ago, but today, with so many good music products on the Amiga market, it's hard to believe that a commercial program includes such a primitive sequencer. If basic musical parameters and MIDI implementation are not important to you, the Tracker should suit you fine; otherwise use DSS for sampling and get a real sequencer.

*(Editor's note: Just before press time, GVP informed us that it has upgraded DSS8. Software sliders have replaced the digitizer's gain adjustment knobs, but the package has acquired a low-pass filter, and you can now make a software choice between line and microphone impedance.)*

*Continued on p. 74.*




## ORK

Beamed down to the planet Ixion from the Legion Ship, Cisskei, aspiring Captain Ku-Kabul has to face the dangers and tests specifically placed on this planet in order to prove himself worthy of Leadership. Failing any of the tests will end his career as a Legion-Command Officer . . . permanently!

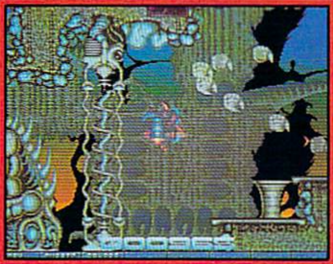
To give him a fighting chance, Ku-Kabul is fitted with twin laser cannons and refuelable jet boosters.

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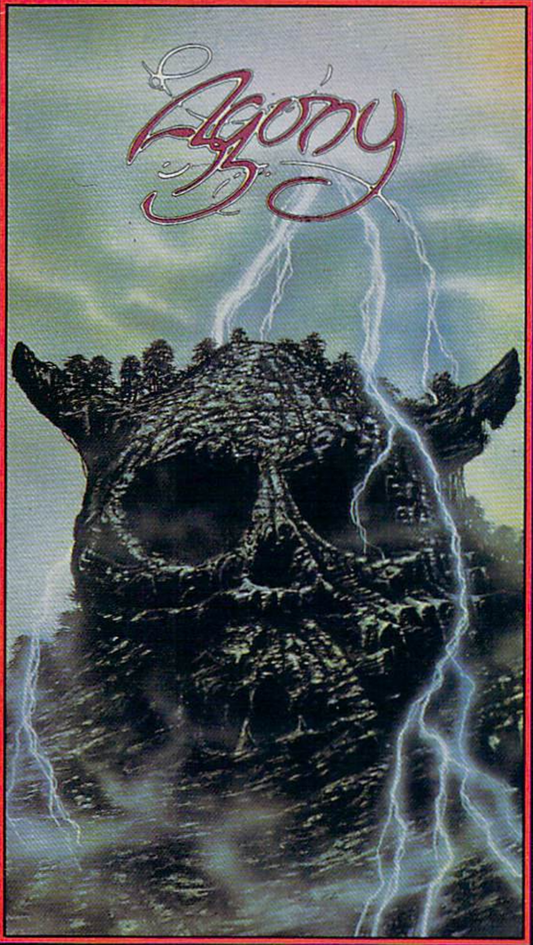
*Screen Shots from the Amiga version.*







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*Screen Shots from the Amiga version.*

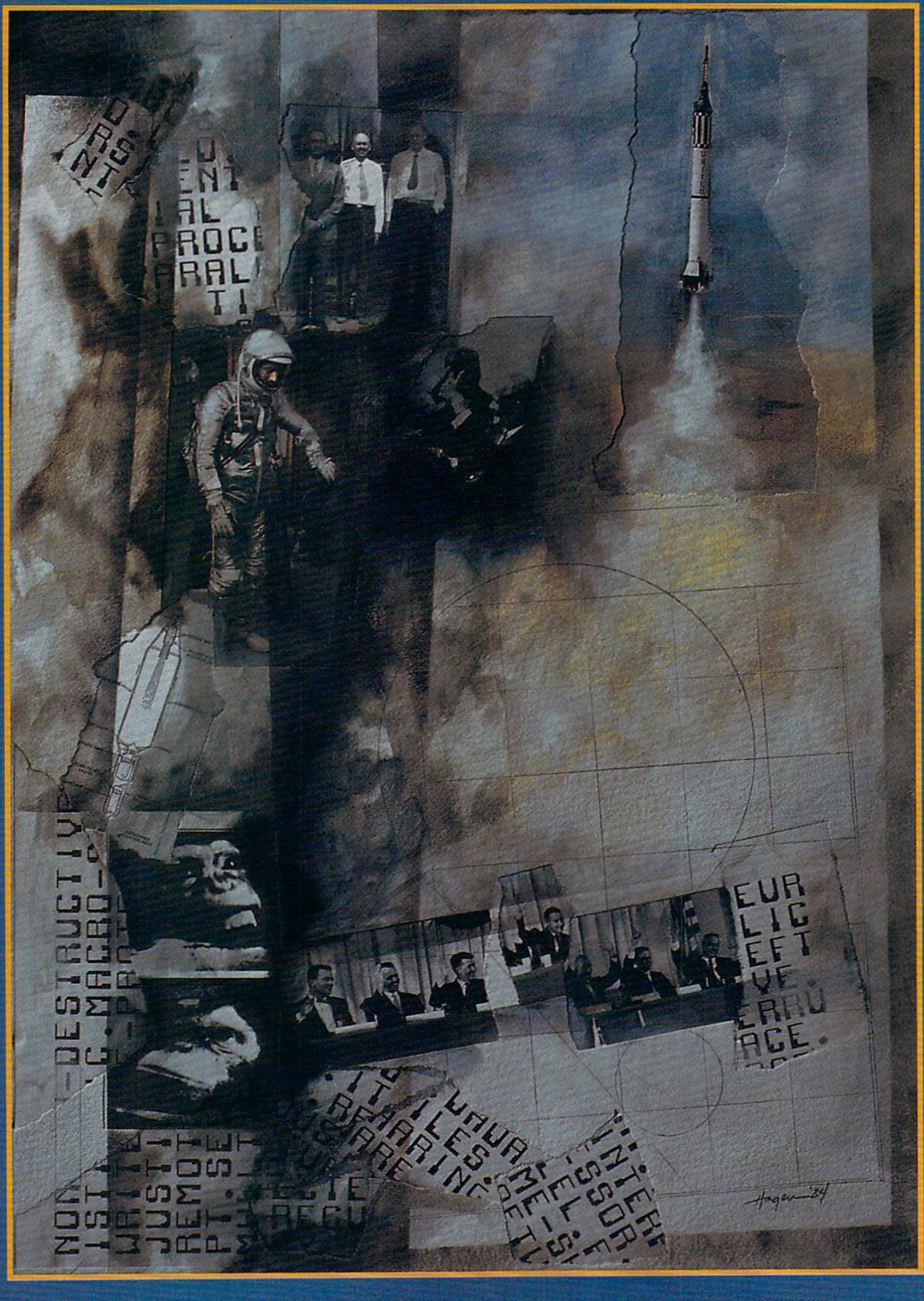






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ILLUSTRATED BY JOEL HAGEN

# Amiga Output as Art

*Paying careful attention to the physical output of your Amiga images—through creative photography, printing, and mixed-media techniques—can reward you handsomely with results that are gallery-quality and suitable for exhibition.*

**By Joel Hagen**

One of the most frustrating challenges facing the computer artist is that of translating electronic images into some form suitable for exhibition. While I feel that both the computer and video are strong new media to create and exhibit artwork, for the purpose of this discussion let us dispense with electronic media and focus on "hard" display for exhibition purposes.

Unfortunately, ordinary printer output has a mechanical quality to it, typically lacking the richness that characterizes the "feel" of traditional media, the "quality of surface" that viewers perceive at a conscious or unconscious level. For computer art to succeed in a competitive gallery setting, that quality must somehow be brought to the physical image that is framed and hung. This article will discuss a variety of methods toward that end.

Let me say at the outset that I have no idea whether or not some of the printing procedures I will discuss here violate manufacturers' recommendations. Before trying any of these ideas, you might be well advised to check on such matters for yourself.

Three main output problems confront the computer artist. The first is the quality and appearance of the material. Does the ink and paper, for example, have a physical character that is as interesting as that of traditional media? The second is scale. How can the artist break the constraints of 8½×11 printouts? The third problem is quality of image translation. How effectively can the original colors, nuances, and resolution of the computer image be translated into a "hard" medium? *(To locate vendors of the products mentioned, see the list on p. 84.)*

### Photography

Because the computer image is composed of dots of colored light, photography can be one of the most accurate means of reproducing that image. You can get fairly good results by shooting the screen with a 35mm camera. Use a long lens, if possible, to eliminate distortion. Shoot exposures of a quarter-second or more to reduce the effect of video scan. For better results, send your disk to an image service for slides or prints of your artwork. Photographic prints can be blown up to any practical size, and they have an established history and legitimacy as a medium.

For photographic prints of Amiga images, the best solution is probably the Polaroid CI3000 film recorder ($4495), which uses ***Art Department Professional*** as its interface (**AD Pro 2**, $299; **CI3000 Driver**, $200; ***ASDG***). This device cables directly to the parallel port ►

of your Amiga. A variety of camera backs can be attached to it for capturing slides, negatives, Polaroid prints, and so on. The CI3000 is capable of imaging on 35mm film at a resolution of up to 2048×1366 in a color space of 16 million colors.

Images are produced on film by digitally controlling a light beam through an internal CRT. The film is exposed through red, green, and blue filters. The AD Pro interface includes controls for calibration, exposure, and color balance. Even if your Amiga is not equipped to display large 24-bit images, they can be rendered by a variety of software or created by compositing in AD Pro's 24-bit color space. These images can be directly exposed to film in the CI3000 with excellent results. Large photographic prints made from 2048×1366 24-bit images are exhibition quality.

### Multiple-Pass Printing

The most widely available method of getting a computer image onto hard media is via a printer. There are high-end color printers such as the Iris that can do a remarkable job of duplicating high-resolution 24-bit screen images onto poster-size glossy paper at about $60 per print. While these printers are beyond the reach of most artists as far as experimentation goes, they also have, to my mind, the limitation of being too slick. The print looks like a commercial poster. Such results can be rather sterile in the realm of fine art. For color prints, I prefer the look and feel of ink-jet output. Creatively handled, an **HP Paintjet** ($1395, ***Hewlett-Packard***) can produce a more interesting surface, in my opinion, than printers costing ten times as much.

Most of the trick in imparting a good look to the ink-jet surface is to do multiple passes (see Figure 1 for an example). The ink becomes dense and fills in any faint lines left by the print head. To print multiple-pass images, make a mark in the tractor-feed margin with which you can later reregister the paper. Use the "set top of form" button and print the image once; then roll it back to the mark and print it a second time. You will see a beautiful velvet quality emerge that is lacking in a single pass. Black, violet, red, yellow, teal blue, and all the "peacock" colors render well in this technique.

A favorite trick of mine is to do a couple of passes as described, and then use a yellow extraction of the image as a final pass to warm the print up. Similarly, you can experiment with using more than one screen image to build up a hard print. Try laying down a base of vivid color and then overlaying a darker, more detailed image. Earthy colors emerge that are impossible to achieve in a single-step print.

If you find the image getting too dark after multiple passes, lighten it first in AD Pro, **PIXmate** ($69.95, ***Progressive Peripherals***), or some other image-processing software. I find that AD Pro gives me the most powerful control over preprint image adjustment. Experiment with brightness, contrast, and gamma adjustment to produce a light version of your image. Save this and build up a hard print in the Paintjet, layer by layer.

Perhaps the most important concept in working with a printer is to think of the machine itself as your artistic tool. If you focus your thinking on the screen, you are likely to fall short of a quality hard image. The printer is the tool laying down the ink, so think of it as your brush. Use the screen only to adjust the image toward an effective printout. That screen image may ultimately bear little resemblance to the final print.

Prior to committing to a full printout, print a test strip, adjust the screen image, and then print another test. Figure 2 shows such a series of image tests from a Paintjet. There is no need to waste an entire sheet of paper and a lot of ink for a test; simply repeat a representative strip until you arrive at a pleasing result.

Before starting any print, run a diagnostic on the printer to ensure the best quality. With the HP Paintjet, turn the printer off, hold down the form-feed button, turn the printer on, and then release the button. The printer will produce a black bar followed by yellow, cyan, and magenta bars as shown in Figure 3.

If these bars are perfectly solid, a good print will result. Often, as in Figure 3, certain jets will be clogged, leaving a white line in the print. Beneath the solid color bars in the diagnostic are rows of black and colored lines. Failed jets show up clearly here because each line represents one jet. In Figure 3, for example, one black and one cyan jet are not printing. The effect of this fail-



**Figure 1. A full-page, multiple-pass print. Repeated passes through an HP Paintjet build up the final image.**



**Figure 2. You should print a series of test strips—like these of astronaut John Glenn—before committing to a final Paintjet printout.**

ure is seen as white lines in the image strip above the diagnostic. Follow the printer guidelines to reprime and clean each cartridge.

### PostScript Laser Options

If you have access to a laser printer, PostScript printing is a powerful opportunity. I have used 300-dpi PostScript images straight out of the Amiga for the illustrations to the *Dr. Bones* series of paperback science-fiction books. Higher-resolution Linotronic printouts are even better. Even so, for exhibition purposes, straight laser output is a bit sterile. What I enjoy doing, however, is layering a PostScript printout over a built-up Paintjet print (see Figure 4 for an example). The warm, solid "graphite black" of laser ink is a smooth complement to the velvet colors of the Paintjet.

I use AD Pro, **PageStream** (v2.2, $299.95, ***Soft-Logik***), **Professional Page** (v2.1, $395, ***Gold Disk***), or **Saxon Publisher** (v1.2, $395, ***Saxon Industries***) as my interfaces to PostScript printing. These programs allow you to size and position a PostScript image on the page so that it matches the position of the underlying image. Don't rely on a sheet-fed printer, however, to give you registration as tight as you would expect from tractor feed.

I like the laser printer's ability to create halftones via PostScript. For my work, I use a **Silentwriter 2 Model 90** PostScript laser printer ($2495, ***NEC Technologies***). If I layer a halftone of an image over a Paintjet color field, the underlying colors show through the dot patterns, creating subtle effects and details. The dot patterns of the color print and the halftone can, however, interfere with each other to cause a "moiré" effect. This is sometimes interesting, but can be objectionable.

Experimenting with ordered and F-S dithering in Printer Preferences at the color stage can affect the moiré interference. Also, AD Pro 2 has a new Saver feature called Prefprinter that can enhance the output of a printer like the Paintjet. Printing via Prefprinter not only produces better ink coverage and more subtle dithering, but allows effective printout of 24-bit color images. The dithering from a 24-bit Prefprinter image is so tight and diffuse that I can overlay a PostScript halftone with no moiré effect.

You can also try Prefprinter to lay black over a color image. Experiment with the Density settings to get the best results from your printer. Floyd dithering at density 1 has fairly large dots, widely and diffusely spaced. Density 4 or 5 produces small dots in a tight pattern. On my laser printer in HP emulation mode, I get fine results from density 4 with the Gamma raised to 36. Gamma adjustment can make or break a high-density Prefprinter image. I get better grayscale fidelity with the laser in Prefprinter density 4, Gamma 36, than with a PostScript printout.

With desktop-publishing software, you can take advantage of the high resolution of object-oriented shapes and drawings. You can create these directly in the publishing software or in a drawing package. Diagonal or curved lines print without "jaggies" at the resolution of the printer. This has a much better look than does a printed bitmap line with its blocky pixels.

Interesting combinations can thus be created by building up a color field with an HP Paintjet and then overlaying linework with a laser printer driven by a program like PageStream, Professional Page, or Saxon Publisher. In fact, publishing software can do a fine job of printing object-oriented lines and shapes with ink-jet or even dot-matrix printers. Different papers can produce more interesting print. I find that gray charcoal paper looks very good with laser ink.

### Printing Multiple-Page Images

The ideas discussed thus far are pretty much limited to single-page prints. It is possible, however, to print an Amiga image at virtually any size by spreading that image over multiple pages. ADPro's Prefprinter and Deluxe PhotoLab's Posters program are good tools with which to explore this process. (PhotoLab is no longer sold separately but is available as part of ***Electronic Arts'*** **DeluxeVideo III**, $149.95.)

I am very impressed with Prefprinter's interface and controls. You can experiment with size, style, print density, and other factors with ease. Each printed image section must be trimmed and the group mounted to another surface for display. Unfortunately, the display looks like a lot of sheets of typewriter paper glued together.

The multiple-page technique, however, really comes into its own for exhibition when the scale of the finished mosaic is quite large. A cleanly mounted ten-foot ►

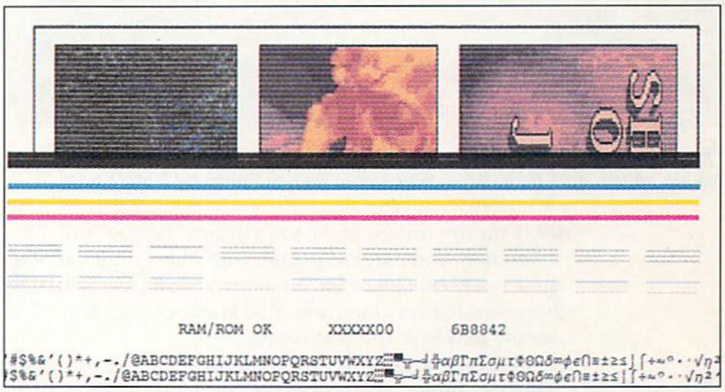



**Figure 3. Before starting to print your image, run a diagnostic test on the Paintjet to ensure that all jets are functioning properly.**



**Figure 4. This composite is the result of layering a PostScript laser printout over a built-up Paintjet print.**

image is impressive, no matter what the material limitations. A few large mosaics can set a mood, or act to pull viewers through an exhibition hall. AD Pro version 2.1.0 adds eight new dithering methods to Prefprinter for some interesting options. There are two new halftone dithers that optimize color mixing, plus four line dithers and a "brick" dither. These are particularly suited to doing very large mosaics. For greater image clarity, try using one of AD Pro's sharpening convolutions on the image prior to printing the mosaic.

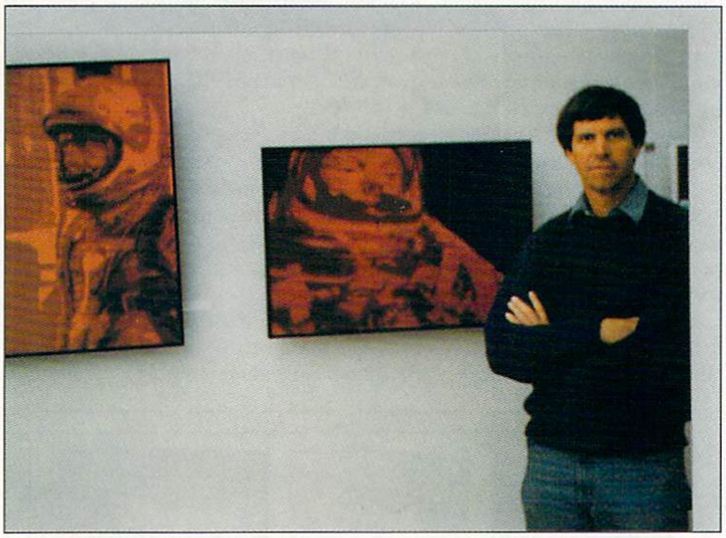


**Figure 5. The author next to his Shepherd/Glenn mixed-media creations at the Yuri Gagarin exhibition in Yalta. Photo by Beth Avary.**

You may find that Prefprinter with Floyd dither at density 1 is a good choice for medium-scale mosaics of 10 to 20 sheets. For very large mosaics, Halftone A or B at a low density may give the best results.

It is possible to create more polished works using the same technique by emphasizing rather than concealing the individual mosaic elements. For example, if each tile is carefully trimmed, then affixed to an interesting surface with attention paid to leaving visible gaps, the arrangement and value composition of the tiles and gaps takes on an esthetic significance beyond that of the image alone.

In a 1991 collaboration with British artist Arthur Gilbert, we reduced an image of Cosmonaut Gagarin to three gray levels and then printed it as a 99-sheet mosaic. The printout, using Posters with its "smoothing" option, took about 30 hours on my Epson dot-matrix printer. Those 99 sheets were sent to 99 astronomical artists all over the world. Each artist used his or her repeated signature as texture to completely fill the gray areas of their chunk of the image. Each artist then mailed the finished sheet to the All Artist's Union in Moscow so that the huge installation could be assembled at the opening of the exhibition celebrating the 30th anniversary of Gagarin's space flight. In this case, the concept outweighed the limitations of the material. Additionally, the personalization of each tile by the artists took the finished piece beyond the realm of a simple printout.

### Mixed-Media Experiments

The signatures of the artists on the Gagarin mosaic brings us to my favorite realm as a computer artist, that of mixed media. To an extent, we have touched on the idea in discussing laser ink over color, but the Amiga artist can explore even greater opportunities by adding paint, graphite, and collage to the output of the computer printer.

Two of my paintings in the Gagarin exhibition began life on the Amiga. Wanting to create stark, documentary paintings to contrast with the more expressionistic Soviet styles, I began with two scenes from our early space program. I reworked images of Alan Shepard and John Glenn in DeluxePaint (**DPaint IV**, $179.95, ***Electronic Arts***), simplifying composition, using fiery colors, and breaking up forms into solid shapes. When the painting was finished, the images were printed as multiple pages on an HP Paintjet. The test strip already mentioned (Figure 2) shows some of the color experiments that were tried on the Glenn image prior to final output.

The printouts were planned to fit masonite panels cut to the maximum size allowed by the airlines that took us into the former Soviet Union. White glue diluted in water was brushed over the entire surface of the untempered masonite. Each trimmed strip of Paintjet tractor paper was dipped in water, then carefully positioned. Failure to wet the prints first causes them to buckle on contact with the glue. Wet paper is also easy to slide around for accurate positioning. Diluted acrylic gel medium was brushed over the entire surface.

When each panel dried, the paper had shrunk slightly, leaving small gaps between the strips. These gaps were filled with patching plaster. When dry, the entire surface was sanded and sponged flat. One more coat of gel medium sealed and smoothed the surface. When that was dry, each panel was painted in acrylics, using the Paintjet mosaic as a sketch. A final coat of matte varnish completed the paintings. Figure 5 shows the finished paintings hanging at the show's premiere in Yalta.

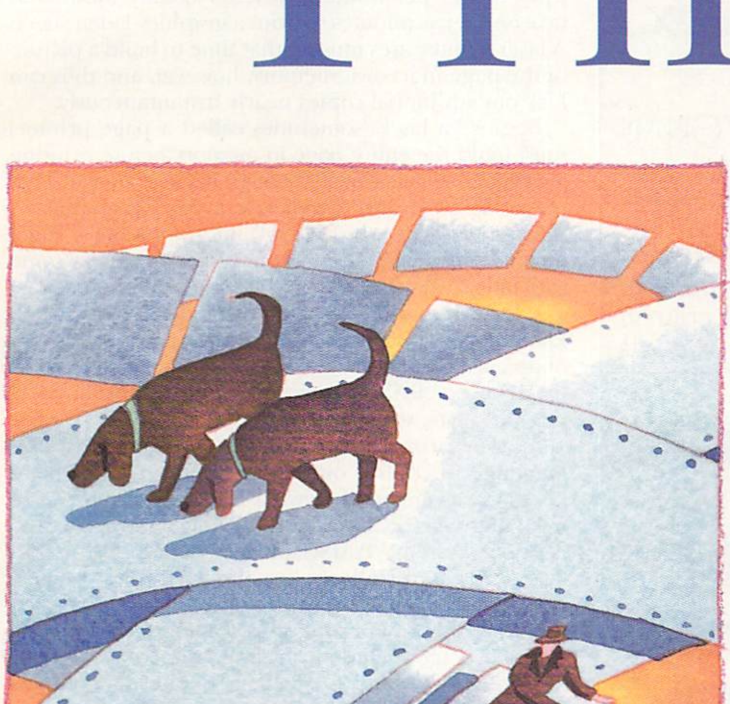
To experiment with enhancing a printout, try attacking it with your favorite medium such as pencil, conte, or ink. A good first project might be touching up a color print with a soft pencil. You can enhance the subtlety of shading, antialias lines, and add new elements to the image. The touch of the human hand immediately elevates the perception of the piece.

Another technique I like is collage. Use the computer and printer to create image elements that are cut, torn, and reassembled to create a final image. I use spray mount on torn pieces of printout to mount them on illustration board. I like to go into this with oils or acrylics to pull together a composition such as the Mercury collage that is the opening illustration of this article.

The wonderful thing about mixed media is that it fully integrates the computer and printer into the studio. The artist must then maintain enough common sense to know when to use a $2500 computer and when to use a 25-cent pencil. Having the mental flexibility to mix these tools freely can produce some powerful work. ■

*Joel Hagen is the author of* AW's *"Accent on Graphics" column and a contributing editor to the magazine. His credits include work in art, astronomy, science fiction, and software development. Write to him c/o* AmigaWorld *Editorial, 80 Elm St., Peterborough, NH 03458.*

# Dusting *for* Prints



*Need some clues on how to track down the right printer to suit your needs? Our hands-on guide reveals the different kinds of printers available, the up-front and hidden costs involved, and the performance you can expect.*

SEARCHING FOR THE right printer can be mysterious business. Finding evidence is not so hard, but can you be sure you have the whole story? A friend testifies that the model he bought is the perfect solution—but are his needs the same as yours? Some prints you've examined point to a particular model—but can you get acceptable quality for substantially less money? Or will you give up options you need by spending less?

As if the situation were not complicated enough, much of what you knew about printers three years ago is now obsolete. That's because today you can afford printers that you could then only dream about. Let's do a little sleuthing to define ►

**By Dave Johnson**

ILLUSTRATED BY KATHERINE MAHONEY

the cost and performance differences and determine your best bet. For information on fingering the right printer driver to work with your chosen output device, see the sidebar "Paper Drive." *(To locate vendors of the products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 84.)*







**The same PageStream file output using a Hewlett-Packard LaserJet IIP ($1295 retail) at 300 dpi (top), an HP DeskJet ($995) at 300 dpi (bottom), and a Star NX-1000 color dot-matrix ($379) at 240 x 72 (opposite page).**

### VERY FINE PRINT

Perhaps the biggest news of last year was the plunge in black-and-white laser printer prices to a floor of $700. (Color laser printers are still very expensive, starting at about $6000.) The main advantage of a laser printer is its 300-dpi (dots per inch) output, an essential feature for professional appearance of copy. Another benefit is its deep, rich, black output—much darker and more uniform than you can get with either ink-jet or dot-matrix printers.

A laser is both quick and quiet (you can print while listening to Pink Floyd's "Wish You Were Here" and never hear it running). The slowest lasers start at four ppm (pages per minute) in letter-quality mode and take only a few minutes to print a graphics-laden sheet. A laser printer uses most of that time to build a picture of the page in its own memory, however, and thus can kick out additional copies nearly instantaneously.

Because a laser (sometimes called a page printer) must build the entire page in memory before printing any of it, the printer needs enough RAM of its own. That means about 1.5MB to generate a page of graphics—such as a full sheet of DeluxePaint graphics or a PageStream document. Although most laser printers come with only 512K, that is changing; you can now find bargain machines with 1.5 or 2MB standard. Be sure you know what you are buying and that you consider the cost of necessary additional memory. Don't be frightened by list prices for RAM, though; while it may list for $400 per megabyte, street prices are closer to $100.

All laser printers use some sort of page-description language to control output. While most lower-price lasers use a version of Hewlett-Packard's Printer Control Language (PCL), a more flexible control method is Adobe Systems' PostScript. (For details on the precision PostScript allows, see the "Why PostScript?" sidebar to the article "Power to the People," Sep. '91, p. 23.) Many Amiga programs, PageStream and Professional Page included, make it easy to avoid PostScript, as they output excellent quality to nonPostScript printers. (See the sidebar "Amiga Software and Lasers," Sep. '91, p. 26.)

If the software you use supports PostScript and you want to use it, you should expect to spend a few hundred dollars more for your printer. (A software-based PostScript interpreter allows you to print PostScript-defined output to an ordinary printer, but it is slow and memory-intensive.) If you think you will eventually need PostScript, but not right away, you might consider a laser (such as ***Hewlett-Packard***'s **LaserJet IIP** or **LaserJet III**) that is upgradable to PostScript via an expansion cartridge. Then, you can wait to purchase the expansion cartridges, which are available from the printer's manufacturer or a third-party developer such as ***Pacific Page***. The additional memory that you installed for printing graphics will be essential for driving that PostScript cartridge, as well.

Resist the temptation to buy the cheapest laser you can find without testing it. Some (such as ***Okidata***'s **OL-400-series** machines) generate unsightly banding when printing graphics, although they are perfectly good for other tasks. You can encounter significant

quality differences in sending the same file to different printers.

### The Jet Set

If you want laser-like output but do not want to pay laser prices, a black-and-white ink-jet printer may be just what you need. For $500 or less, the ink-jet produces wonderful output as high as 360 dpi.

Unlike the laser printer's toner cartridge, which renders pages by allowing the laser to "burn" the ink off the roller and onto the paper, ink-jet printers feed from a vial of ink that fires at the paper through several dozen tiny nozzles. The ink is designed to dry almost instantly on contact with paper, though some printers rely on special clay-based paper to aid ink adhesion.

It is a good idea to find out what kind of paper works best with the ink-jet you are considering before you buy. Some paper stock is costly. Paper type is also important for obtaining the highest quality of output. Printers (and inks) designed for clay paper will invariably generate blurred hardcopy on ordinary paper, so use the best paper you can afford if you want to get sharp, laser-like output.

Printing time is one more consideration for ink-jets: 15 to 30 minutes or more per page is average. And because ink-jets are not "page printers," every copy takes the same amount of time to print. Ink jets are pleasantly quiet, however.

As long as you can find color cartridges for the black-and-white ink-jet you choose, you can use a color-separation process (as most desktop-publishing software allows) to print in full color by making numerous passes on the same page with inks of different colors. It is a time-consuming process that's susceptible to paper-alignment errors, but the results are often breathtaking. You can get color cartridges for various ink-jets from such companies as InkMat, Jet Technology, and Software Sensations.

For more convenient but still affordable color output, ink-jets are still your best choice. ***Hewlett-Packard***'s **PaintJet** ($995) is the best-known of these low-cost color printers. It can offer very rich color saturation (depending on exactly what you are printing) with all the traditional characteristics of its black-and-white counterparts.

Color printing involves some special considerations because, while "printing" to your Amiga's monitor is a subtractive process, printing to paper is additive. On screen, a pixel with red, green, and blue elements all pegged at 15 appears white. Now imagine mixing equal quantities of those colors on paper. Quite the opposite of white, no? That incongruity often makes it tricky for a printer to accurately render on paper what you see on the screen.

Because of the special problems involved in color printing, I recommend you try a color printer before you buy—or at least purchase it from a store with a reasonable return policy. Do not settle for the demo prints that the sales people are all too happy to show you in the store. Those demos are optimized to show off the machine's best color-rendition abilities, and they rarely involve the colorful and detailed graphics the Amiga can output. Many of the sales people who demonstrate these printers think eight-color exploded pie charts are pretty amazing, and they may have no concept of how you plan to use the machine.

Until recently, if you wanted a color ink-jet, you were



pretty much limited to 180 dpi. While that resolution may be acceptable, it forced many people who were weighing color at 180 dpi versus black and white at 300 dpi to stay away from ink-jets. With the recent introduction of the ***Hewlett-Packard*** **DeskJet 500 Color**, 300-dpi color now retails for $995.

This is a printer to be reckoned with, but it is not perfect. Instead of four colors, the DeskJet Color uses three, which results in less-than-ideal color accuracy in some images. Because there is no black ink when printing in the color mode, the printer uses all of the other inks to reproduce black tones. This means that black does not saturate well, and the DeskJet goes through ink even more quickly than other ink-jets. Although Commodore has not yet released a driver for this printer, ***Creative Focus*** sells one called **Super_DJC**.

### Dots the Way It Is

The "Old Faithfuls" of the industry, dot-matrix printers have been around forever and are best sellers because of their versatility, low price tags, and negligible maintenance costs. These days, the battle lines are drawn firmly between the 9- and 24-pin varieties. The ►



9-pin type is probably the cheapest printer you can buy (starting at approximately $150 for black-and-white and $190 for color), but you pay in terms of limited resolution.

Though 9-pin printers can provide densities up to about 240 dpi, there are two serious limitations to driving dot-matrix at resolutions that high. First, there occurs a phenomenon called banding: very noticeable stripes of ink appear across the page. Also, the image can become very muddy and indistinct, particularly when printing in color. Happily, dot-matrix printers generally support enough densities so that you can find a useful one for every type of printing task.

With 24-pin printers, you can usually print in high resolution (around 300 dpi) without resorting to multiple passes—at a still-reasonable cost ($200 and up). The result is pages that are reasonably free of smearing and banding.

Both 9- and 24-pin printers come in color and black-and-white versions. If you do have a color printer, you can conserve the somewhat more expensive color ribbons by buying black ribbons to use for black-and-white-only tasks.

Printing speed is one of the most hotly advertised features of dot-matrix printers. The fastest can kick out about 200 characters per second (cps) in draft mode and around 75 in near-letter-quality (NLQ) mode. The slowest ones drag along at about 25 cps.

Dot-matrix printers have been around for so long that it is hard to find a truly bad one. Because they are so inherently noisy, however, keep an ear out for those that have good sound insulation. Dot-matrix are the only printers that come in wide-carriage configurations for handling special printing tasks like large spreadsheets. While a wide-carriage unit might make life easier for you, there's no sense paying extra for such a feature if you never need to print wide stock.

### Hidden Costs

When you shop for a printer, remember that the three-digit figure on your charge card is not the end of it. Maintenance costs tend to add up, particularly if you print in volume. Laser printers require replacement toner cartridges, which cost between $50 and $150 dollars and are usually good for a few thousand copies. Ink-jet cartridges run about $30 or less, but they are good for only a few hundred sheets. Dot-matrix printers require only ribbons, which cost less than $10 and provide acceptable saturation for a hundred pages or so. (Once a ribbon is too worn to use for official correspondence, it can have a long and fruitful life printing draft and in-house copies.)

Do not underestimate the long-term cost of special paper, either. Clay-based stock for some ink-jets is rather costly, and using plain paper diminishes the quality of your output.

Laser paper is more expensive than ordinary stock, but it comes in many grades, and you can experiment on your own to find a happy medium. Using poor grades of paper in a laser can seriously shorten its lifespan, so choose carefully. Some laser paper has a decidedly evil finish, ecologically speaking. If you are so inclined, there are several sources for recycled laser stock, including ***Earth Care Paper***, which will be happy to send you samples.

Though paper capacity is not a concern for dot-matrix printers, which run with tractor-feed paper or print one loose sheet at a time, keep in mind that both laser and ink-jet printers vary widely in the size of the paper tray. You may not need 250-sheet capacity now, but think ahead to be sure that a 50-sheet tray won't drive you insane later on. Many printers are designed to optionally accommodate one or more large-capacity trays.

Also, while most printers accept envelopes one at a time, some can handle multiple envelopes. And if you wish to produce overhead transparencies, make sure the printer is capable of producing them. This is not a given by any means, particularly with color printers.

A printer is a long-term investment. If a laser is what you really need, do not settle for an ink-jet. If a dot-matrix is sufficient for your needs, think seriously about buying a 24-pin machine instead of a 9-pin. Whatever your output goals, buy the best printer you can afford and keep the future in mind. ■

*Dave Johnson authored the book* The Desktop Studio: Multimedia with the Amiga, *in addition to several reviews and articles for Amiga magazines.*

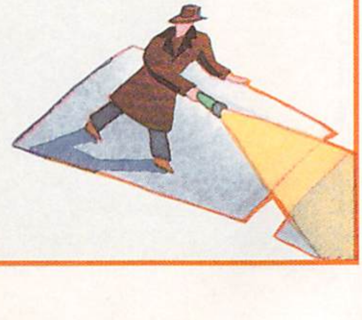
## Paper Drive

**The issue of printer drivers is often a source of confusion. It's an important topic, too, because without a driver you cannot send output from your computer to a printer. It is a good idea to settle on a driver before actually purchasing a printer, and finding the right one is not as complicated as it may seem.**

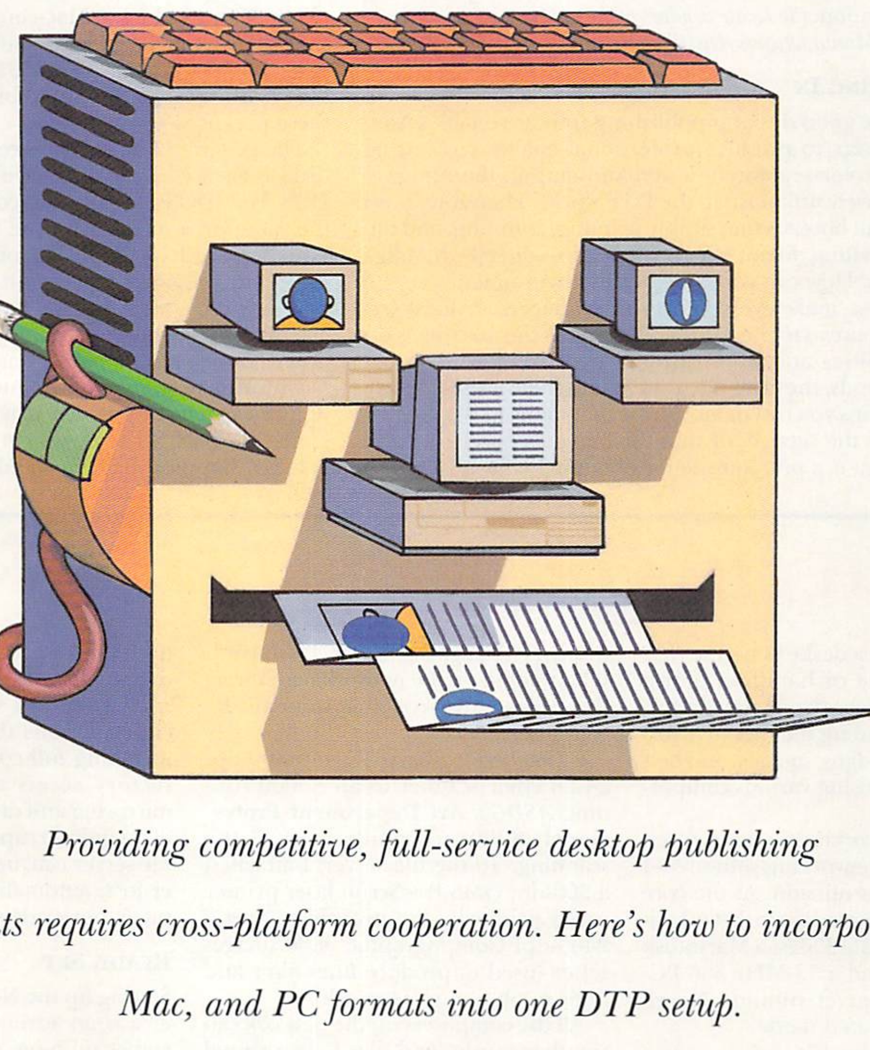
**Your Workbench Extras disk contains drivers for nearly every popular printer. These are named for easy identification. For example, the driver labeled HP_DeskJet is optimized to work with Hewlett-Packard's line of DeskJet printers. Beware, though: if you choose a printer that has just come out on the market, an older driver may not get top performance out of it—or even be able to run it. HP's new DeskJet 500 Color printer is an example.**

**Although, as mentioned in the article, Commodore has not yet released a driver for the color DeskJet, Creative Focus sells one called Super_DJC. There are several other such developers—including *Glass Canvas Productions*, *ACDA*, *Micro Programs*, and *Tychon Technologies*—that sell custom drivers. You can also find drivers on BBSs and networks, as well as in the *Fred Fish* collection of public-domain software. (Add any driver to the Printers drawer in your Devs directory.)**

**If you do not find a custom-built driver for a printer you want, be sure to check your printer's manual for a list of emulation modes. Many manuals list alternatives in the order in which they work best. As a last resort, you can use the Generic printer driver that's found on the Extras disk, although it will probably not be able to output styles (such as bold and italics) or graphics. —DJ** □



# DTP-ing WITH THE ENEMY



*Providing competitive, full-service desktop publishing to your clients requires cross-platform cooperation. Here's how to incorporate Amiga, Mac, and PC formats into one DTP setup.*

As Amiga users, we want to do everything on our machines just because others try to tell us we can't. Unfortunately, Amiga desktop publishers find themselves in a world dominated by Macs and PCs. Although I will always brandish my Amiga sword, I think it may be time to use a different strategy to further the Amiga crusade. A multiplatform desktop-publishing setup allows selective use of the best features of the Amiga, the Macintosh, and the PC.

The Macintosh leads the field with its excellent 24-bit image enhancement and painting packages. Other strengths of the Mac are its well-featured illustration programs and its multitude of printer-control and calibration utilities. (Macintosh utilities can calibrate the density and color accuracy of imagesetters, as well as manage memory and hard-disk-resident printer fonts.)

Because the PC is so widely used for word processing, most text files you receive from clients are apt to be in MS-DOS format. Also, Windows 3.0 has greatly increased the ease of use over DOS-based systems, and there are now some excellent ►

**BY EYO SAMA**

ILLUSTRATED BY BARTON STABLER

24-bit painting programs (such as Aldus' PhotoStyler) that are good alternatives to Mac-based software costing twice as much.

The Amiga, on the other hand, is perfect for jobs requiring 3-D ray-traced imagery, fast layout and design work, and the integrating of data from multiple platforms into one project.

So, given the different strengths and varying capabilities of the three platforms, how can you incorporate the best elements of each into your DTP setup? I will start by outlining what you can do with a limited budget and take you through to an explanation of how you can set up the ultimate networked desktop-publishing operation. *(To locate vendors of the products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 84.)*

### FITTING IN

While good desktop-publishing software enables Amiga users to produce professional-quality typesetting and color-separated design and output, the Amiga is relatively unknown in the DTP world. Therefore, most output bureaus that supply printing, scanning, and image setting do not offer those services directly to Amiga users. How can you cope in this environment?

First, make every effort to introduce your local service bureau to the Amiga. Show them the machine's capabilities and how, through networking and other methods, they can integrate it into their present setup. Perhaps you can demonstrate that many in the area require the service, or that the bureau's purchase of an Amiga is a prerequisite for obtaining your business.

If you cannot get direct Amiga services, then you must be able to read and write the formats these service centers do support. There are several programs that enable the Amiga to read and write both PC- and Mac-format disks. ***Consultron***'s **CrossDOS** ($39.95), for instance, allows your Amiga to read 720K and 5.25-inch 360K MS-DOS disks. ***ReadySoft***'s **AMax II** ($249.95), plus a Mac disk drive and Macintosh ROMs, not only lets you read and write 800K Macintosh-format disks, but also lets you run some Macintosh software.

Unfortunately, AMax II does not work in color, so you cannot benefit from the displays of 8- or 24-bit software. ***Central Coast/New Horizons'*** **Mac-2-Dos** ($349.95, including a Mac-compatible floppy drive) simply lets you read/write 800K Mac floppies. (See "Royal Opportunities," Sep. '91, p. 40, and "Forging the PC Link," Dec. '91, p. 51, for more information on these packages.)

The program I often use to read and write MS-DOS disks is Kjell H. Didriksen's **MultiDOS**. Unlike CrossDOS, MultiDOS allows you to access MS-DOS disks with the same drive names you use for your Amiga disks. Whether you have an Amiga or MS-DOS disk in any drive, any programs you use on your Amiga will automatically recognise the disk. Incredibly, this commercial-quality program is in the public domain. You can find it in the ***Fred Fish*** library as well as on BBSs.

Unfortunately, because Commodore has not added higher-capacity floppy-disk drives to all Amigas, there seems generally to be no way to take advantage of the 1.44MB floppies that are standard on both the Mac

## THE ULTIMATE SETUP

*Mission*: To set up a desktop system that would be capable of handling entire publishing projects (from the design stage through sending the files to print) and accepting designs, images, and text files from clients using various computer systems.

Thanks to networking—and to excellent new Amiga networking software—I accomplished this mission. At the core of the system I devised were three Amiga 3000s, three IBM PS/2s, a Macintosh IIci, a Mac SE, and a 33-MHz 386 PC-compatible file server running Novell Netware in dedicated mode.

Attached to the file server was a 600MB SCSI hard drive, accessible by all the computers on the network. Because Novell Netware does not allow partitions larger than 256MBs, I divided the drive into three partitions. On the A3000s, all running Oxxi's ACS, the partitions show up as three drive icons on the Workbench screen.

The Mac SE hosted a 9600-baud modem, which we employed to receive clients' PostScript, image, and text files, whether Amiga, Mac, or PC based. When stored on the network hard drive, these files were accessible from all the computers.

I attached a Sharp JX-450 300-dpi 24-bit color scanner to an A3000 running ***ASDG***'s **Art Department Professional ($299)** to handle most of the scanning. To the file server, I attached a 300-dpi QMS PostScript laser printer (used primarily for proofing), and a 2400-dpi Compugraphic 9800 imagesetter (used to produce final films and high-resolution paper work).

All the computers on the network can simultaneously send files to be printed on either printer. The way the Netware queues work is very useful for scheduling print jobs of different priorities. You can set up Novell's Netware to have several printing queues; files sent to be printed are spooled to the file server's hard disk and output to the appropriate printers in the order received. You can even have multiple queues serving one printer. We have express and slow queues; files in the slow queue are sent to the laser printer only if the express queue is empty.

Netware has several safety and security options that protect your data, including full control over file and directory access and support for disk mirroring and duplexing. With the help of an uninterruptible power supply, the file server can, upon detecting any power loss, automatically log off users and safely power down the network.

### READY, SET

Setting up the Novell Netware file server was an adventure; Novell's software comes on more than 30 disks, and the manuals are encyclopedic. The first chore was to get the 386 PC to run without any interrupt, DMA, or memory conflicts. Unlike the advanced bus design of the Amiga, PC boards do not auto-configure; you must configure them separately by juggling several jumpers. We had to install a SCSI controller in addition to Arcnet, Ethernet, I/O, and VGA cards. Thankfully, setting up the PC client software was easy.

and PC. (With CrossDOS and a high-density Commodore floppy—now shipping with the A3000—you can read 1.44 MB PC disks.) Both MultiDOS and CrossDOS, however, claim to be able to read and write to MS-DOS-formatted hard-disk drives. (I have not tried this feature, but it surely is intriguing.) This brings me to the best method of integrating Amigas, Macs, and PCs: networking.

### NET GAIN

Just a year ago, networking was a foreign concept to most Amiga users. Although it is still in its infancy for the Amiga, we now have a few options for constructing networks.

By the time you read this, ***Oxxi***'s **Amiga Client Software** (ACS) **for Novell Netware** (starting at $199) should be available. Novell Netware, one of the most widely used networking systems on the PC, is the only one I know of that allows networking between Amiga, PC, Macintosh, NeXT, and Unix systems. To use ACS, you must connect your Amiga—via an Arcnet or Ethernet card—to a PC running the Novell server software.

Oxxi's software allows your Amiga to print to any device that is attached to the file server (the PC), which automatically spools printing requests from any computer on the network. Any fixed or removable hard disk attached to the file server appears on the Amiga Workbench as if it were a local drive, and it is accessible through all Amiga software. Such drives also appear on the Macintosh desktop and on other computers attached to the network.

***Commodore*** recently released it **NFS** (Network File System) **Client Software** ($199), which allows you to add Amigas equipped with Ethernet cards to a network served by a Unix NFS file server. (NFS is the networking system used by Sun Microsystems' computers and many other Unix-based systems.) According to Commodore, it is possible to use the NFS software to attach Amigas to a PC server running Novell Netware 386 with an NFS module, although I suspect that an NFS server must also be involved.

***Progressive Peripherals***' **DoubleTalk** ($450-$500) AppleTalk board allows Amigas to network between each other using the peer-to-peer networking software provided. It also lets the Amigas link into an existing AppleTalk network, enabling them to share files with Macs and print to the AppleTalk ports of laser printers connected to the network.

While AppleTalk is slow compared to Ethernet- or even Arcnet-based systems, it is also much less costly, because you do not need a separate file server to run the DoubleTalk network.

### NET SETS

In the sidebar "The Ultimate Setup," I describe the optimum system for a desktop-publishing venture. Although I think it is the ideal solution for working efficiently to handle whatever your client gives you, the setup is also quite expensive. If you do not have the budget to install and maintain such a system—or if you want to begin on a smaller scale—then you can use just parts of the system. ►

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The installation of the Macintosh Netware software was also simple. One annoying limitation of the Macintosh, however, is its inability to run both AppleTalk and EtherTalk at the same time. This meant that we could not bridge the network between Netware and AppleTalk unless we installed an AppleTalk card on the file server, which would increase the server's work load.

The Amiga client software is not only easy to set up, but also offers the most elegant and complete interface of the three systems. Oxxi's very thorough ACS includes most of the utilities you need to manage and control the network. These have the same functionality as the PC-version utilities, but the ease of use of Amiga software. You can set directory and file restrictions for individuals, groups, or all users, and you can even restrict access times. You can view and modify the printing queues and use the included hard-disk backup program to back up the network drive—including both the resource and data forks of Macintosh files. (I often use this feature to transfer resource forks from the Mac to the Amiga; it lets me avoid first having to convert the Mac files to macbinary format.) A message facility lets Amiga users send messages to other network users.

Access to the network drive from the Amiga is very fast, even using Arcnet cards. In fact, I found it faster than some Amiga peer-to-peer networks operating with Ethernet.

### HOW IT WORKS

To demonstrate how the system works, I will describe the execution of a typical project—creating a full-color brochure for a client.

We received the WordPerfect-format text by modem on the Mac SE, which automatically saved it to the network drive. We edited and formatted the text on one of the PS/2 machines using WordPerfect.

We scanned the color pictures into an Amiga 3000 and saved them to the network drive in either TIFF or TGA format. From there, we loaded the pictures into the Macintosh IIci (equipped with a 24-bit graphics card) running Adobe's PhotoShop. We used PhotoShop to modify and color-correct the images and to do photo montage and other special effects (which I would like to be able to do on the Amiga!). We saved the finished images to the network drive, and from there loaded them into Gold Disk's Professional Page on an A3000.

After color separating the images on the Amiga, we sent them to the printing queue serving the imagesetter. Meanwhile, we downloaded extra Adobe Type 1 fonts (which the brochure required) to the imagesetter using the Macintosh. Finally, we shipped the imagesetter-produced film to the printer.

With the network, we were able to use components created on any of the three machines with layout and illustration software on any of the other machines. For example, we converted fonts and Adobe Illustrator files from the Mac for use on the Amiga, and we typeset Amiga-generated text with PageMaker running Windows 3.0 on the PCs. —***ES*** □

If, for example, you do not have an in-house imagesetter, you can save your huge, color-separated PostScript files to removable hard disks and send them to an output service. Another option is to compress your files with such public-domain utilities as **ARC, ZIP**, and **LHARC**, some of which have counterparts on the Mac and PC. You may be surprised how large a compression factor you can obtain with PostScript files.

Faster than compressing is backing up files with something like **QuarterBack** ($69.95, ***Central Coast/New Horizons***) and restoring them to the hard disk of your service bureau's Amiga.

If you have Amigas, Macs, and PCs, but cannot afford a network, you can connect the computers via serial cables and use terminal software to transfer files. Set the machines to the highest baud rate available and use a protocol such as ZModem to transfer the files. With ZModem, you do not have to bother naming the files at your destination, but keep in mind when sending PC files that the file-naming conventions of that system demand a name of not more than eight characters, plus a three-character extension. Serial connection is a slow transfer method and should be used only if you cannot fit the compressed files onto a floppy disk (which happens often if you deal with color separations and 24-bit images).

Using one DoubleTalk card, an Amiga, a Macintosh, and an AppleTalk laser printer, you can set up the beginnings of a larger system. This setup lets you use the Amiga for layout and design work, and for creating 24-bit ray-traced images that you can then transfer to the Mac, taking advantage of its 24-bit image-editing facilities and printer control.

You can construct a similar system with an Amiga and a PC. You could attach a high-capacity removable drive to each machine and use MultiDOS or CrossDOS to read and write files directly from your Amiga applications onto MS-DOS-formatted cartridges. By using **Aldus PhotoStyler** on the PC for your 24-bit editing needs, and **Professional Page**, **PageStream,** or **Saxon Publisher** on the Amiga, you'd have a fairly capable system.

If possible, try to purchase a color scanner that you can use on your Amiga, Mac, or PC, depending on your software preferences. With the Mac and PC, you can edit the files immediately after you scan them. With the Amiga, on the other hand, you have the advantage of scanning much faster than on the other systems. If you need to scan numerous pictures without major editing, the Amiga will save you time. Then, you can transfer to other machines any files that need editing.

As you can see, it is possible to successfully integrate the Amiga into an environment involving other computer platforms. It's not a question of "fight or switch"; it's simply a matter of joining forces to best serve the customer...and to make things easier for yourself. ■

*Eyo Sama was editor and publisher of the former* Amigo Times, *a full-color magazine created entirely on the Amiga. He currently works as a consultant, author, and developer.*

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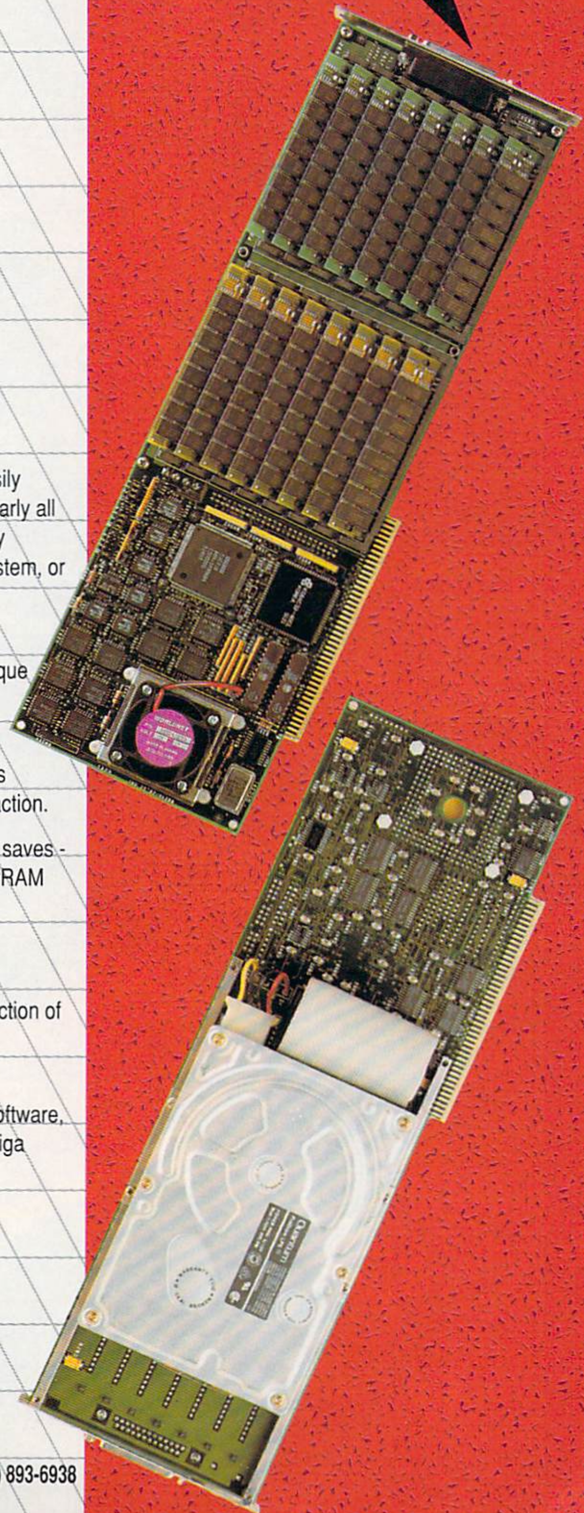
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## GETTING THE MOST FROM WORKBENCH 2.0–PART II

THE VISIBLE DIFFERENCES between Kickstart 2.0 and 1.3 are like the very large tip of an even more gigantic iceberg: While just a cursory look reveals that much has changed, even greater, more significant differences lie hidden beneath the surface. These hidden changes in 2.0 take the form of new programming tools and operating-system routines that give programmers more flexibility than ever in creating powerful and easy-to-use programs. And while the visible changes in the operating environment are easy to spot, the effect of the new programming tools is apparent only when they result in new features in applications software.

*More than simply enhancing Workbench operations alone, new 2.0 features will also make many applications programs more powerful, flexible and easy to use.*

Until recently, 2.0 was available only on the A3000, so few commercial programs have added such "2.0-only" features. Now that 2.0 is an option for all Amigas, and will soon become standard equipment, more and more programs will be adding these advanced features. Let's take a look, then, at what the new programming features mean to the current 2.0 owner, and also what we can expect in the near future. *(To locate vendors of the products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 84.)*

### EMPHASIS ON "APPLICATIONS"

Among the more widely-used programming enhancements to 2.0 are the calls that provide applications with access to the Workbench and its icons. These calls let programs create new objects known as AppIcons, AppWindows, and AppMenus. AppIcons are icons that appear in the Workbench window. Although they look like normal icons, they don't necessarily act like them. The program that creates an AppIcon is notified whenever the user double-clicks on the icon or drags another ►

By Sheldon Leemon

ILLUSTRATED BY KENNETH McMILLAN

icon on top of it; it is then up to the program to decide what to do next.

Version 3.2 of **ProWrite** ($175, ***New Horizons***), for example, opens an AppIcon that's called "ProWrite Deposit." When you double-click on this icon, it brings the ProWrite screen or window to the front and activates it. When you drop the icon for a text file on it, however, it loads that text file into ProWrite.

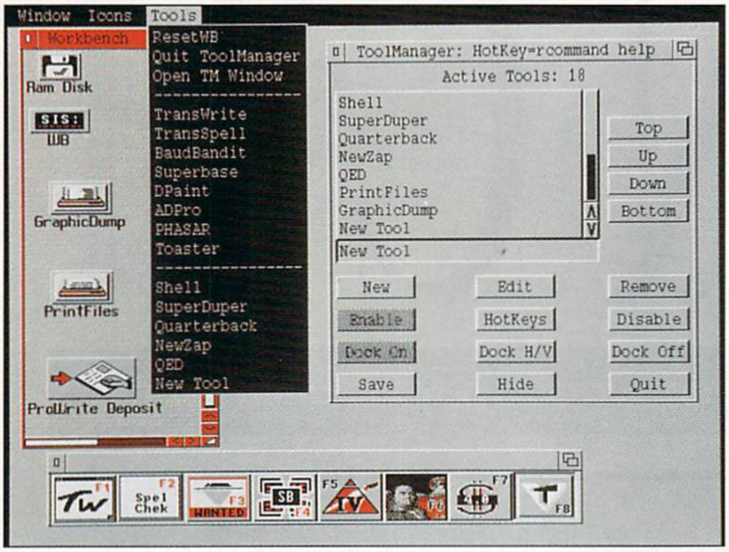



**Figure 1. Stephan Becker's ToolManager lets you take advantage of 2.0's new "App" features. AppMenu support allows you to add your own applications to the Workbench Tools menu. AppIcon support allows you to put your own icons on the Workbench window. From the screen above, you can print a file or show a graphic by dragging its icon to the appropriate Workbench icon. The dock window at the bottom of the screen (which lets you launch a program by clicking on its icon) is also an AppWindow, so you can load a data file into a program by dragging its icon to the picture of the program.**

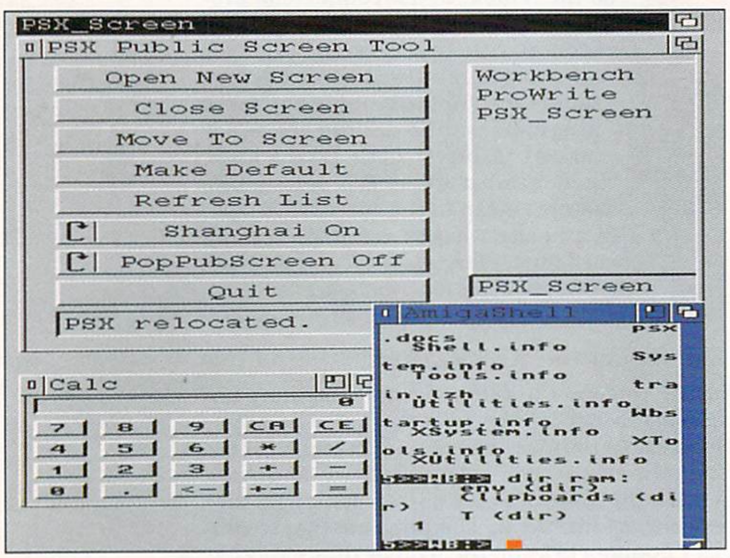
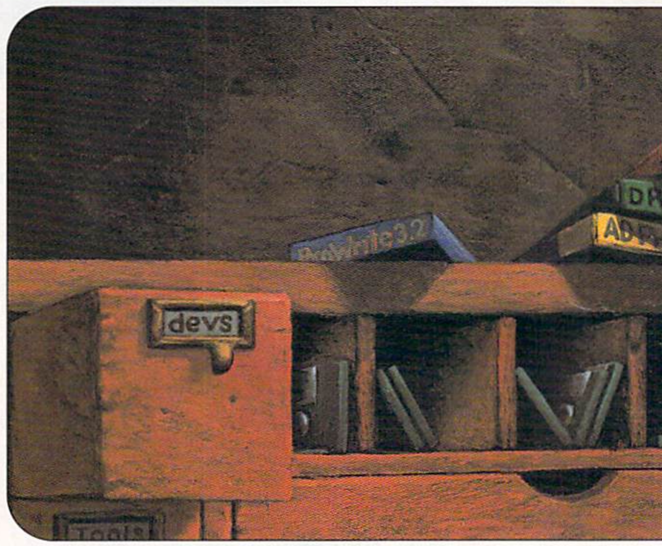



**Figure 2. With Steve Tibbett's PublicScreenX, you can create public screens and "shanghai" Workbench applications to them. Here, the PSX Screen Manager, a Shell window, and the Calculator have all been opened on a low-res, interlaced public screen.**

The third way in which a program can make its mark on the Workbench is through the use of AppMenus. This new facility allows a program to insert one or more menu items on the Workbench Tools menu. AppMenus have spawned a large number of freely-distributable tool-menu managers, including AddTools, ToolsX, and ToolMenu, all of which allow you to list your favorite programs as menu items and to start them right from the Workbench menu.

My favorite, though, is Stefan Becker's **ToolManager** (***Fred Fish*** **#551**), which uses all three of the "App" features (see Figure 1). Its configuration window uses an AppWindow, so you can add programs to the menu bar simply by dragging their icons onto the list. It also lets you create an AppIcon for any program. This means, for instance, that you can make an AppIcon out of the PrintFiles program and print any text by dragging its icon over the picture of the printer.

Using Recolor, you can change the colors of multiple icons by shift-selecting them and choosing a menu item, instead of dragging them all to the AppWindow. When you run ProWrite 3.2, for example, it adds an item to the menu bar that lets you flip directly to the ProWrite screen.




## Going Public

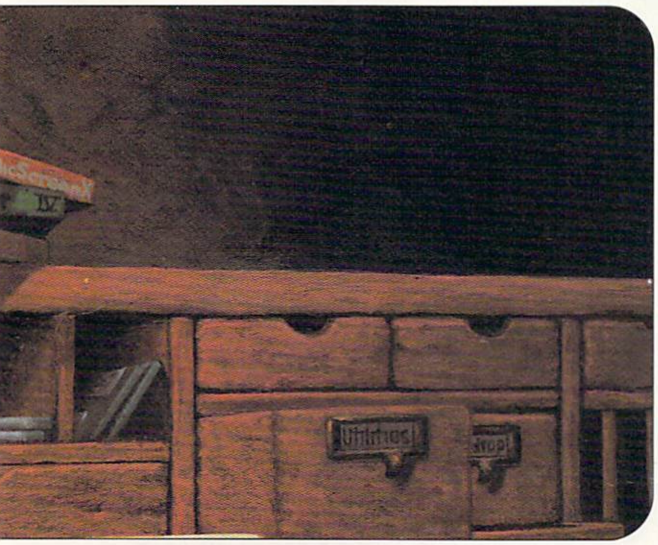
One new 2.0 feature that you will probably hear a lot more about in the future is the "public screen." Kickstart 1.3 allows for only two types of screens, the Workbench screen and custom screens. Many different programs can open their windows on the Workbench screen at the same time, but they all have to accept the graphics mode, resolution, and number of colors of that screen. Custom screens let the program choose the mode, resolution, and number of colors—but only one program can open its windows on that screen.

Kickstart 2.0 introduces a new type of screen, the public screen, that extends the usefulness of custom screens beyond such limitations. You can use public screens like custom screens that allow other applications to open "visitor" windows on them. Visitor windows might include such utilities as color-palette ad-

justers, magnifier windows, clipboard managers, or any one of a dozen other "parasite" programs. You can also use public screens to create multiple Workbench screens. By setting a special "Shanghai" flag, you can force Workbench applications to open instead on your public screen (hence the term "shanghai," as in "force or trick into captivity").

Not many applications use public screens as yet. ProWrite 3.2 does open a public screen named "ProWrite," and you can also get the program to open on a named public screen by adding a ToolType to the program icon. The best way to experiment with public screens is to pick up a copy of Steve Tibbett's **PublicScreenX** program (***Fred Fish*** #483). It allows you to open new public screens of varying modes and resolutions, and then to "shanghai" Workbench applications to those screens (see Figure 2).

Kickstart 2.0 also provides some new shared program libraries that make it easier for developers to follow the recommended Amiga style guidelines. Although these libraries may not result in many new



applications-program features, they should make some of the standard features more common and their implementation more uniform.

For example, the ASL library makes it easier to use the standard file and font requesters. The result is that nearly all of the Workbench programs—including the Preference editors, IconEdit, the More Utility, and even Ed, the CLI text editor—present file requesters that allow the user to select the file to save or load. Some programs, such as ProWrite 3.2, even allow you to substitute the standard ASL file requester for their own.

Another new shared library, the GadTools library, makes it simple to create sophisticated gadgets and menus that respond appropriately when the user changes the default system font to something other than Topaz 8. **Art Department Professional 2** ($299, ***ASDG***) uses these tools to create a chooser window that allows 2.0 users to select multiple-choice options from a list, rather than toggling through them one at a time (see Figure 3).

### Devices for Your Desires

Some of the familiar AmigaDOS devices have been enhanced for the 2.0 release. The console device is now font-independent. This means you can employ just about any font with applications that use a console window for text display, such as the Shell and the system text editors. New console windows wait for a click on the close gadget, which makes them much more useful for displaying the output of CLI-only programs that you can now run from the new Workbench.

The clipboard device, which was designed so you could exchange IFF text and graphics data between applications, has been enhanced to be more suitable for that purpose. Console windows now use the clipboard for copy-and-paste operations, which makes it possible to copy text from a Shell window into an Ed edit window (see Figure 4, top) or into the window of any other application—such as **Final Copy** ($99.95, ***Softwood***) or the freely distributable TurboText and VLT—that uses the clipboard for cut-and-paste procedures. I hope other programs will follow suit, thus helping to expand the clipboard into an exchange medium that supports dynamic updating.

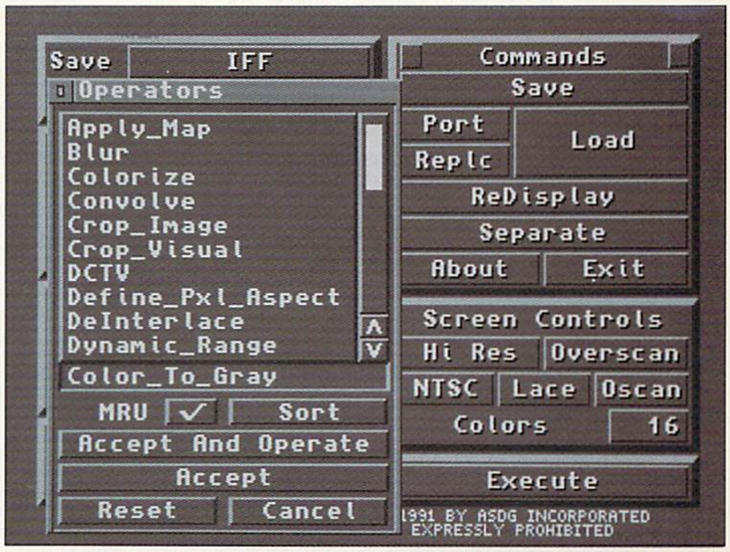



**Figure 3. When you run ASDG's Art Department Professional 2 from Kickstart 2.0, the program presents you with a chooser window instead of making you toggle through multiple-choice options.**

Another AmigaDOS device receiving a facelift in 2.0 is the narrator feature, which you use to produce synthesized speech. The new narrator speech model is more complex than the old one, providing many more controls that allow you to produce more interesting and natural-sounding speech. These include an enthusiasm control that makes the voice sound more or less "excited," a perturb control that can make the voice "shaky," and an articulation control that lets you adjust the speech from sharp and deliberate to slurred.

Other controls allow you to make the speech sound throatier or more nasal, or even to change the way vowels are pronounced in order to create regional accents. The only program that currently allows you to experiment with these narrative improvements, however, is the freely-distributable **SpeechToy2** by Chris Demiris (see Figure 4, bottom). ►

The Compugraphic outline-font technology introduced in Workbench 2.0 mainly provides support for screen fonts, but the technology will certainly produce software that provides smooth-looking text of almost any size. ProWrite 3.2 is the first program to use the Compugraphic system-font support for printing, but others are sure to follow suit—particularly as Commodore enhances its programming support.




Another font change users will be happy to see is that the system now recognizes ColorFonts, such as the popular **Kara Fonts** (***Kara Computer Graphics***), which provide textured or metallic-looking characters. **DeluxePaint IV** ($179.95, ***Electronic Arts***) users will no longer have to run the ColorFonts support program in order to make use of these fonts.

### Hardware Helpers

Finally, 2.0 provides software support for a wide variety of optional hardware. Programs can open custom screens in Productivity or SuperHires modes on machines that have ECS (Enhanced Chip Set) Agnus and Denise chips. So far, ProWrite 3.2 is the only piece of productivity software to take advantage of this option. On the video side—which is what SuperHires was designed for—**Broadcast Titler 2** ($389.95, ***InnoVision Technology***) is the first program we are aware of to support that mode's 1472×480 display.

The ECS chip set also offers new genlock modes that allow you to replace color registers other than zero with video, but so far we have not seen any software developed to control this new capability. Even if you do not have the ECS Denise chip, the ECS Agnus allows you to switch from NTSC (the US display standard) to PAL (the European standard) under software control; most 1084 or multiscan monitors can be adjusted to display either format correctly.

It is possible to control the Workbench screen from the ScreenMode Preference editor, but it is up to the individual applications to control their custom screens. AD Pro 2 will open a PAL screen if you request that display mode, and the freely-distributable **AmigaToPAL** and **AmigaToNTSC** programs by Nico François (***Fred Fish*** #575) will "trick" any application into opening its custom screen in the desired mode. This makes it much easier to use European software in the US, and vice versa.

Kickstart 2.0 also provides support for the 68040 processor, the fastest chip in the Motorola 68000 family. As this processor becomes more common, 2.0 will help Amiga users to run their programs faster than ever before.

### Much More To Come

While we have already begun to see the appearance of software with features that would not be possible without 2.0's programming support, there are many new, powerful functions that are still untapped. For example, Intuition now provides support for Menu Help, a feature by which the user can receive an explanation of a program option by holding down the Help key while selecting the menu item for that option. While there are not many programs using Menu Help yet, it is likely to become a widespread feature in the future.

Another relatively unexplored attribute is 2.0's support for scrolling screens that are larger than the display. Such screens would let desktop-publishing applications update a whole page at a time, rather than building a small part of the display based on which portion is currently showing. This feature requires a lot of chip memory, but makes it quite easy to build and display large bitmaps such as those required for a fax program.

A further "hidden" capability of 2.0 is support for cooperative record locking, which prevents two users from changing the same portion of a database simultaneously. This should inspire the first true networking applications for the Amiga.

So, although 2.0 has been a long time coming for most of us, it will still be some time before its full impact is felt. Only in the weeks and months ahead will Amiga users really discover all of the ways in which it can improve both our operating environment and our applications. ■

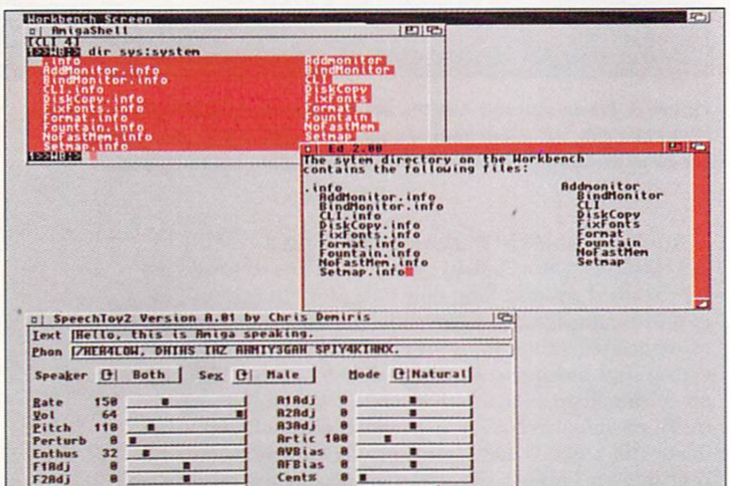



**Figure 4. Enhanced 2.0 support for the clipboard device makes it possible to copy a directory listing from a Shell window and paste it to the Ed text editor (top). Similarly, additional support for the narrator device will allow you to use such programs as Chris Demiris' Speechtoy 2.0 to try out new synthesized speech options (bottom).**

*Sheldon Leemon, a well-respected authority on virtually every aspect of the Amiga, is currently writing a book on Workbench 2.0 for Compute! Books. When he is not writing for computer magazines, you can find him working at Slipped Disk, a Michigan-based Amiga dealer.*

ACCENT ON GRAPHICS

# Starfields and Asteroids

# 39

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

THE ANIMATED STARFIELDS we see as the "Enterprise" plies the spaceways may not be astronomically plausible, but they sure look great. This month's "Accent" outlines some easy tricks to get you up to warp 7 without busting your asteroid.

### Seeing Stars

To try the animated starfield, work in DeluxePaint (Electronic Arts) in a 32-color mode. Set up a palette with a smooth sequence comprising all 16 gray levels from black to white. Establish that as range 1. If you are using DPaint IV, make sure that the range begins on the first position of the Range bar and that each successive position is filled with the next gray value in the sequence as shown in the illustration accompanying this column.

On screen, set up the black sky—which can be anything from a full overscan black screen to a black window in an imaginary control panel. Next, select the straight-line tool with the right mouse button. This brings up the Spacing requester. If you are new to DPaint, this is one of the most underused features of the program, and the starfield is a great first exercise in which to try it out.

The Spacing requester has four options: N Total, Every Nth Dot, Airbrush, and Continuous. The last of these is the default selection, and it simply draws in a continuous unbroken line with the current brush. Remember that the Spacing requester affects all the line tools except dotted and freehand. Your settings will apply to straight or curved lines, unfilled circles, rectangles, ellipses, and polygons.

Of the other options, Airbrush draws the line with the current brush, using the airbrush at its current spray diameter. Every Nth Dot draws a line by placing one copy of the current brush at regular intervals along the path of the line. You define the interval by entering a number in the requester. N Total places a defined number of copies of the brush along the path of the line. If you enter 8 and draw a line, eight brushes will be evenly spaced along that line no matter how long or short it is. For this exercise, select N Total and enter 16, the number of colors from our range.

As a test, select white from the range as a foreground color and draw a straight line with a single-pixel brush. You should see a line of 16 dots. Now select Cycle from the Mode menu, and draw a straight line again. This time you should see a sequence of evenly spaced dots ranging from black to white as shown in the illustration. Undo or erase the test lines and select Frames/Set# from the Anim menu. For reasons that will become apparent, I find it most effective to create a number of frames greater than N Total that has no divisor in common with N Total. Try 25 frames.

On frame 1, position the single-pixel brush roughly in the center of the sky, hold down the Animpainting key, drag a line to the edge of the sky, and release the mouse button. You should see stars painted one by one on 16 successive frames, black in the "distant" center and growing bright at the edge. If the stars start white and grow darker, return to the Range tool and reverse the range. Hit the 4 key to loop the animation, and you will see a convincing animation of a star zooming out of the distance past your screen.

Now build up multiple stars by repeating the line from the center toward different points at the edge of the screen. Do not return to frame 1 for each line; simply begin on any frame you end up on. Because you made the frame count an odd number greater than N Total, each star begins moving on a different frame, adding to the

## Create your own "Star Trek" special effects with these simple DPaint animation techniques.

natural feel of the animation. After making ten or twenty star paths, hit the 4 key to see the result. The feeling of motion is quite convincing, enhanced by the growing brilliance of the stars as they near the viewing plane.

**AND NOW FOR A DIFFERENT SPIN...**

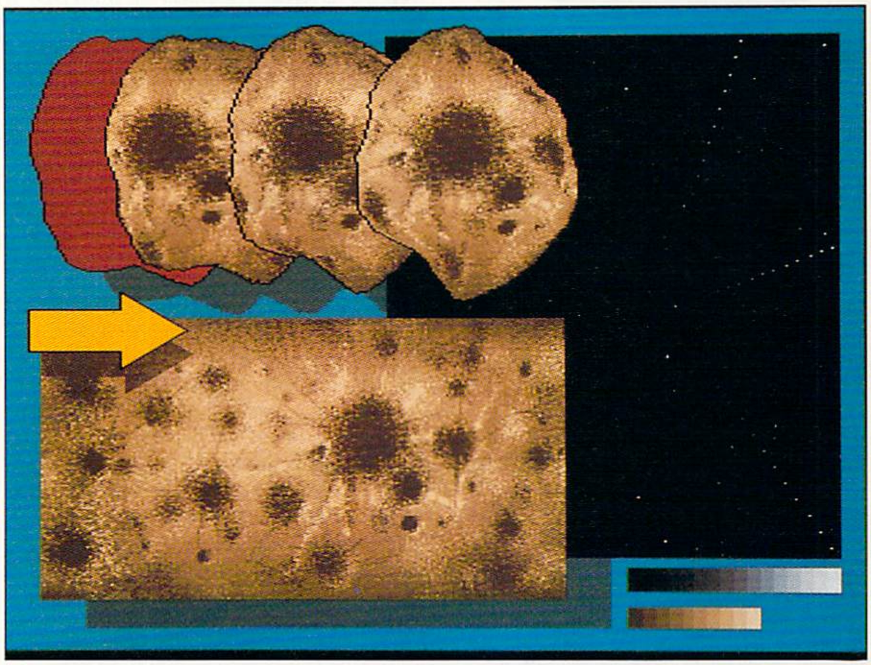
This animation can stand alone or provide a backdrop for other objects, titles, or animbrushes. It serves as a great background for a ray-traced spacecraft or rotating planet. One of my favorite things to add to a starfield is an asteroid with compound rotation. The illustration shows the stages involved in creating such an object. For more detail on making a spinning planet, consult my planet-building article ("Around the World in 80 Frames," Oct. '91, p. 39) or read the tutorial on page 177 of the DPaint IV manual.

This project is a more complex extension of that idea. Briefly, create a map of the surface of the asteroid that is two squares wide, 100×200, 80×160, or whatever. To paint craters, I use the airbrush in Shade mode, with a range like the one shown in the illustration. Set up 25 blank frames to match the frame count of the starfield animation. Use the Move requester to move the map across the screen an x-axis distance equal to the map width. Repeat that move with the map following itself to make a smooth, seamless scroll. Using Animbrush/Pickup, grab exactly half of the area of the moving map—one square.

To create the compound tumbling effect, clear the animation frames and draw a rough-contoured, filled-freehand asteroid shape in a solid color, like the red shape in the illustration. Pick it up as a brush and, with the Move requester, rotate it 360 degrees on the z-axis over 25 frames. Now set the Fill Type to Wrap and select Animbrush/Use. Hold down the Animpainting key and execute an Anim-Fill on the rotating shape with the map animbrush. Note that Anim-Fills are possible only with DPaint version 3.21 or higher. Play the loop to see the asteroid in motion.

The illustration shows three successive frames out of 25. The eye is fooled by the detail of the rotating map into seeing a rough, solid object rotating on its y-axis. Unless your shape was extremely irregular, the z-axis rotation is no longer noticeable. Plant this asteroid in your starfield for an interesting effect, or use the Move requester to add a motion path guaranteed to make any Trekker duck! ■

*Joel Hagen's credits include work in art, astronomy, science fiction, and software development. Write to him at 10512 Sawyer, Oakdale, CA 95361. Please include a stamped, self-addressed envelope for a reply.*



"Asteroid and Stars" (above) shows color ranges and the stages in creating an animated starfield and an asteroid that uses compound rotation.

VIDEO SUITE



# Crispy Clips with Traveling Mattes

*With all the 24-bit advancements of the past year, who'd have thought that a simple black-and-white graphic would be your ticket to high-end video effects?*

**By Mark Swain**

ONE OF THE tricks to using computer imagery in video post-production is mastering the crispy luminance clip. This means to cleanly paste a computer graphic (title, image, animation) over another video source. Yes, a genlock accomplishes this task, but not with a luminance key. Genlocks simply remove color register zero and replace it with another video source, thus limiting a genlock to the Amiga's basic resolutions and color palettes.

When you use 24-bit graphics or single-framed (24-bit) animations over live video, they become video sources, not computer sources. In cases like this, the basic Amiga genlock will not work; you need a luminance keying device, which removes either the brightest or the darkest part of a video source. So, with a graphic containing white text on a black background, you could replace the black or white with another video source.

The problem in luminance keying arises when the graphic to be keyed has both light and dark properties. For example, take a 3-D ball that is lit with a spotlight on the upper-right side. The rendered 3-D ball would contain a very bright spot on the upper right, but be very dark on the lower left, making it nearly impossible to achieve the crispy edge or luminance clip that you need for the production.

The solution is to use a traveling matte. Also known as alpha channels, key-holes, stencils, and matte fills, traveling mattes serve one very useful purpose—crispy luminance keys. A traveling matte works by using a black-and-white silhouette of the computer imagery to cut a hole in the background video source. You fill the hole with the detailed version of the graphic. The final result is a cleanly composited image that gives the overlayed graphic crisp edges.



**The cleanly composited space and space-station scene created from Figures 1, 2, and 3.**

## Crispy Matte Creations

The first step in creating the traveling-matte effect is to generate the graphics to be overlayed. You can use a 2-D or 3-D graphics package, but always keep the background plate in mind. When placing your images, determine what works best with the background video.

Animations that need to match live-action background movements can be troublesome. Consider, for example, the combination of a live-action background of a distant purple planet and a few stars (created by panning a camera over a painting or photograph) and a 3-D space station that orbits the mysterious planet. The background pans from the right, leaving the planet in the screen's lower-left corner, and the space-station animation should match this motion as closely as possible.

To accomplish this, grab two or three frames of the background at different stages of the live footage to use as a reference in the animation package. If you use the reference frames as backgrounds for key-frame positions of the animation, you can easily place the space-station object in the proper perspective and location. Once you set the key frames, surfaces, and lights, and save the scene, remove the backgrounds and render the space station on solid black. Finally, single-frame the animation to videotape.

You can create a traveling matte for a 3-D environment by simply modifying ►

*All photographs are of actual DCTV screens.*

TV

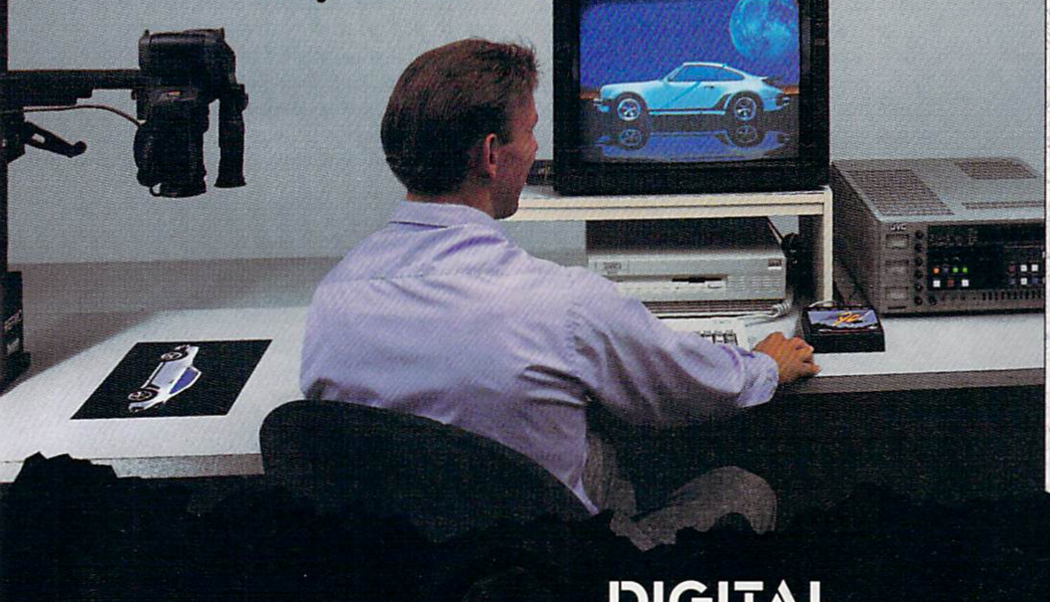
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your finished 3-D scene. First, remove all texture maps or surface details that you added to the original animation. Then change each of the surface colors to white (255 in each of the RGB sliders). The matte should contain only black and white, so you must turn off the object's shading. Of the three basic ways to do this, choose the one that works best for your 3-D animation program:

*Method 1*: Remove all lights from the scene. In LightWave (NewTek), change the first light's intensity to zero. Next, increase Ambient light to 100 percent.

*Method 2*: Remove all lights, as above. Turn on LightWave's Luminous function or Imagine's (Impulse) Bright function for all surfaces. The Luminous and Bright functions cause the object always to be the surface color, white.

*Method 3*: Change the Diffuse value for all surfaces to zero percent. Then turn on the Luminous or the Bright function as described above.

Finally, make sure the animation will be rendering on a black background. With the changes complete, test-render a few frames to make sure you get a crisp black-and-white traveling matte. Now, render it, save all frames, and single-frame the traveling matte to tape.

## Edit Points

With your three video-tape sources in hand, head to the editing room to assemble them into a composited animation. To accomplish a traveling matte in which all three video sources are live or moving (as in our example), you need a video-tape recorder for each source, another to record the final composite, and a switcher. Your first step is to connect the VTRs and switcher. Start with source A, the background, on the program bus. To cut the hole in the background source, input source B, the traveling matte, to the external keying portion of the switcher. Feed the final source, the detailed 3-D animation, into the matte-fill section of the switcher.

Editing all of these sources is fairly easy. Using a computerized editor that controls all four VTRs, you do little more than synchronize the traveling matte, the animation, and the background. The alignment of the matte and the animation must be frame-accurate, however, or you'll flub the effect. In the final result, the traveling matte cuts a hole in the background that the detailed animation then fills.

This example, with four VTRs, is, of course, an extreme case. One way to cut down on the amount of equipment is to use a D2 recorder or a digital disk recorder (DDR). D2 recorders have the ability to record and play at the same time: You could play the background on the D2 and record the final composited video over the original background. The obvious problem with this method is that you erase the master background video source. DDRs are similar beasts: You could record the background to side A of the disc and the final composited video to side B. This method has the advantage of not erasing anything in the process.

A third way to cut down the number of high-ticket items required is to make one or two of the sources still. For example, you could freeze the background on a still store or time-base corrector and composite it with an animated traveling matte. Or, the matte could be a still logo over a live background.

Another ultra high-end method is to composite with a DDR and a Video Toaster (NewTek). DDRs are very expensive ($30–180K), but if one is within your reach, this is a nifty compositing idea. The recorder accepts both video-source and alpha-channel (traveling matte) input. The Toaster can output two signals—program and preview. Thus, if the program bus outputs an animation frame, and the preview bus outputs the matte, then you can composite the computer imagery very cleanly with a background video source on the DDR. This method also eliminates the need to single-frame both the animation and the traveling matte before compositing. The process composites and single-frames all of the imagery in a single pass—no VTRs and no editing.

The process is very manual, however. You must load each frame of the animation and the traveling matte, and operate the recorder manually. The only way to automate this process is to save all of the frames (animation and matte) in LightWave as framestores and to sequentially load them into the Toaster's switcher, using a clever ARexx script. The script should allow you to load the next frames into the correct busses by pressing a key, leaving only the DDR on manual operation.

## Crispy Toaster Clips

The Video Toaster is the perfect device for demonstrating the effects of a simple traveling matte. First, create the image and the matte in LightWave. Start by entering LightWave with a click of the 3-D button in the Toaster's switcher. Next, select the Object menu and load the urn from the phonebook. The default positions of the object and camera are fine, but you should adjust the light. Move it to the urn's far left or right, creating a dramatic effect, with one side of the urn lit and the other dim.

Next, select the Camera menu and turn off Overscan, switch on Letterbox, and select the Antialias rendering mode. If you wish, you can alter the surface characteristics of the urn before rendering. The final step in LightWave is to click the render button and wait. When the urn is finished, return to the Scene menu and click Enter Switcher. ►

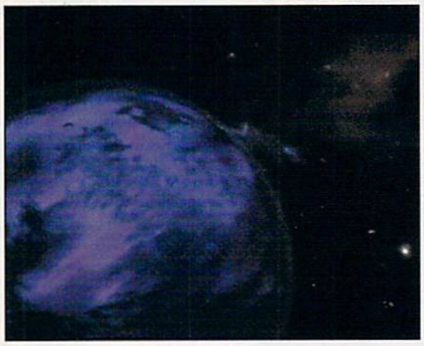


**Figure 1. The space background plate, which is set on the Video Toaster's program bus.**

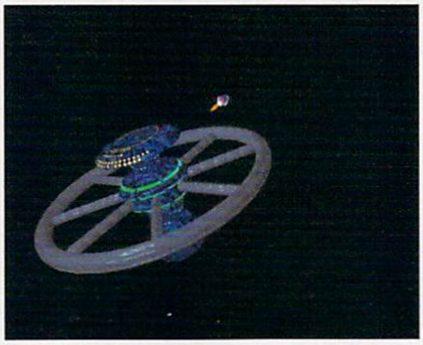


**Figure 2. The overlay image of the space station, which is set on the Video Toaster's overlay bus or the key-fill portion of most switchers.**

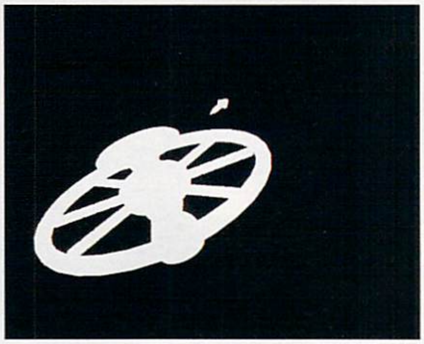


**Figure 3. The black-and-white traveling matte of the space station, which is set on the Toaster's preview bus or the external-key portion of most switchers.**

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- Amiga 500,1000,2000,2500,3000

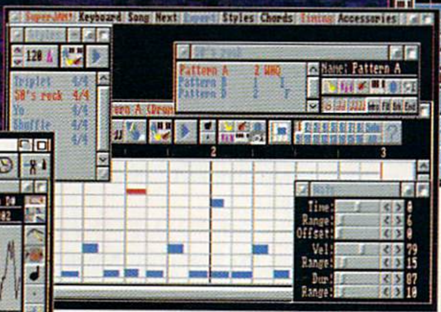
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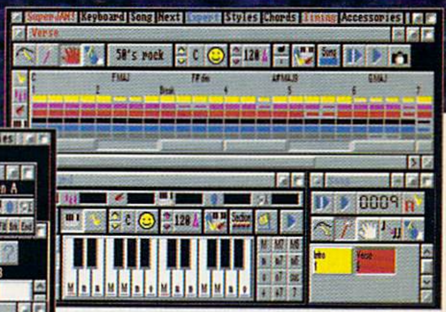


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In the switcher, select DV1 on both the preview and program busses and save the new image as a framestore.

To create the black-and-white matte version of the image in LightWave, you simply tweak the lights and the surface characteristics. First, return to LightWave from the switcher and enter the Surface menu. The matte image should have no shading, so change the diffuse value to zero percent. Next, change all surfaces to white. You should select the Luminous button for each of the named surfaces. Finally, click the Render button to create the matte image. Return to the switcher and save the matte as a framestore.

To use the matte effect, load the image of the urn to DV1 and the matte image to DV2. Instead of using live video for this project (which takes too much time), enter the Preferences menu and select Video Snow as the background generator. Return to the switcher and select bank D of the effects grid. The Toaster effect that makes the traveling matte possible is the Art Card crouton (the keyhole icon). This effect accepts three video sources, the background plate on the program bus, the source image on the overlay bus, and the traveling matte on the preview bus.

To set up the project, select the Art Card effect, set the preview bus to DV2, the program bus to BKG (Background—or Live Video if you wish), and Overlay to DV1. Next, click on the scissors icon to select luminance keying for black. Finally, set the clip level under the scissors icon. The best level that I obtained was between 30 and 45 (depends on image luminance). Once tweaked to perfection, the urn is cleanly clipped over the video-snow background.

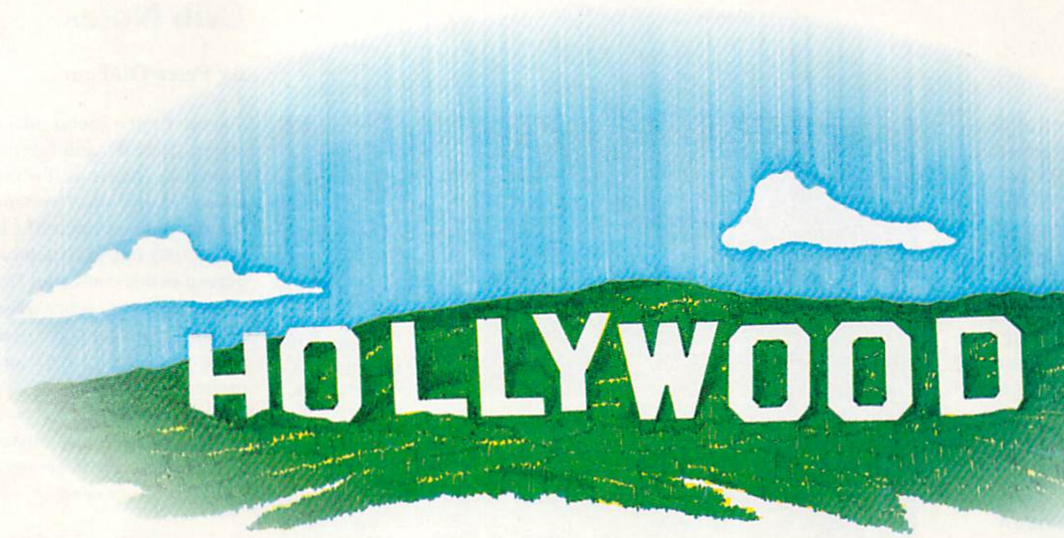
### More Marvelous Mattes

You can use crispy Toaster clips for a number of other sensational special effects. One of the most obvious matte effects is to generate black-and-white text with the character generator or LightWave, and then fill it with a videosource or graphic texture. You could also try painting the matte in ToasterPaint or other 24-bit paint programs.

For example, suppose that in your next feature video, a scene calls for the back window of your home to overlook an oceanside vista—but you live in the Midwest. No problem for the Toaster matte: First lock down the camera and frame the window scene. Freeze-frame the scene and save it as a framestore. Load the window scene into ToasterPaint and paint the glass parts of the window a solid white. Next, remove everything in the scene but the freshly painted glass. The final result in ToasterPaint should be a black-and-white matte, with the white parts in the exact positions of the glass panes of the window in the live-action scene. Return to the switcher and set up the Art Card effect as described above, with the window matte on the preview bus. The final step is to find video footage of an ocean vista and set the clip. Your property value just skyrocketed! ■

*Mark Swain is a California-based freelance writer who does video post-production and computer animation. Write to him c/o* AmigaWorld *Editorial, 80 Elm St., Peterborough, NH 03458.*

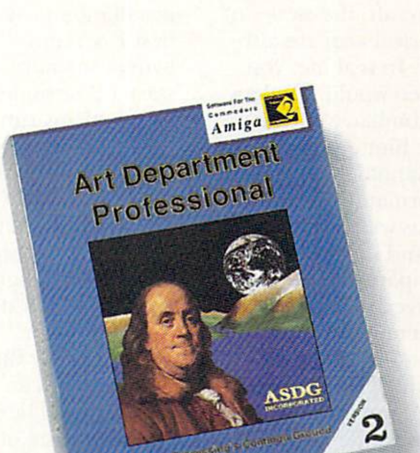
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# THE GAME PRESERVE

## Red Baron

**By Rob Hays**

Could you do better against Baron von Richthofen than Snoopy did? **Red Baron** (*Dynamix*/ Sierra, $59.95) is your chance to test your aerial skills against not only the Red Baron, but also some of the finest pilots on both sides of World War I. From navigation (no satellite positioning system), to coordinated tactics (no radios), to dogfighting (no missiles), this war is up close and personal.

Your choices are many and varied in this game. You can dogfight against a famous ace, fly single missions, or begin a career. Aircraft choices are limited to types that were available at the time, and choosing a historic mission places you in the aircraft that was originally used. If you play the career game, you are assigned to a squadron and stationed in the same towns at the times the historical squadron was there.




**Are you a World War I flying ace?**

You can adjust flight-skill and combat levels, as well as such aspects as the reliability of the guns. In addition to modelling the physical and aerodynamic characteristics of the aircraft, the tactics of the historical aces are also included. In real life, von Richthofen would not do a loop in combat, and you won't see him do one here.

The manual is packed with information on the aircraft, as well as historical background on the war and its participants. In addition, you receive area maps and a quick reference card.

There are some stiff requirements if you intend to climb into the cockpit: dual floppies or a hard disk (the installation program is the best I've seen), one megabyte of memory, and Kickstart 1.2 or higher (there are no problems running under 2.04). True fast RAM (memory attached to the expansion bus) and a CPU speed of 14 MHz or higher are also recommended, for the game is too sluggish to be enjoyable on a standard 7-MHz system.

If you enjoy flight simulators and have an accelerated Amiga, it will be a long time before you tire of Red Baron.

## Birds of Prey

**By Peter Olafson**

*Electronic Arts*' long-awaited flight simulator, **Birds of Prey** ($49.95) won't knock you out right away. My guess is that it'll take a few days.

It's set in a mythic surf-and-turf environment pitting a Side A, supplied with US and European planes, against a Side B that flies Soviet craft. After picking your side and airbase, you ►

## Crib Notes

**By Peter Olafson**

Maybe it's the moon. Maybe it's spring. (Nah, it's still February as I write this.) Maybe it's the fact that, a few issues back, I pretended to know something about The Immortal ($49.95). But, all of a sudden, I'm getting all this mail about *Electronic Arts*' isometric action adventure, which was released about two years ago. We're short on space this month, so I'm going tackle a few hot spots in the game, and then move on to some mail-related matters. We'll be back to our usual lack-of-format next month.

• Lots of folks are stranded on Level 4—in each case by a ring of one kind or another. This "level" actually has several sublevels, and one of the rings you need is on the top and largest sublevel, in a place you'd probably rather avoid.

Using the flying carpet, follow the corridor with the firepits to its end. Here you'll find a piece of clothing, and within it a tiny ring. Now, through the door, back to the bend in the hall, across another firepit room on the rug (but do be direct, as the rug has a limited life), and have a nap in the room you'll find in the corridor off the other side.

You'll need to descend the ladder, defeat the trolls at the bottom, and then descend again to find Ana, the ring's owner. In exchange, she'll give you a ring and a clue to the other problem people are having on this level: Clockwise three rings around the triangle. Hey, this looks like Level 2 all over again. Naturally, people think the three rings in their inventory are the three intended. Well, they're right. *Not*! Rings are circles, and you're expected to walk clockwise around the triangle three times. Welcome to Level 5. ►

**To locate vendors of the games reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 84.**




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- **BURST NIBBLER.**
Now this super disk copier program is built into Action Replay Mk III. Just imagine a superfast, efficient disk copier program at the press of a key - no more waiting.
- **SAVE PICTURES AND MUSIC TO DISK**
Pictures and sound samples can be saved to disk. Files are saved directly in IFF format suitable for use with all the major graphic and music packages. Samples are displayed as screen waveform.

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Useful for removing ugly borders when using NTSC software. (Works only with newer Agnus chips).
- **SLOW MOTION MODE**
Now you can slow down the action to your own pace. Easily adjustable from full speed to 20% speed. Ideal to help you through the tricky parts!

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like Rename, Relabel, Copy, etc.
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Simply press a key and the program will continue where you left off.
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With Sound Tracker you can find the complete music in programs , demos,etc. and save them to disk. Saves in format suitable for most track player programs. Works with loads of programs!!
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From the Action Replay III preference screen you can now set up autofire from 0 to 100%. Just imagine continuous fire power? Joystick 1 and 2 are set separately for that extra advantage!

NEW
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Now many more external Ram Expansions will work with all Action Replay III commands.
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With the new "Diskcoder" option you can now 'tag' your disks with a unique code that will prevent the disk from being loaded by anyone else. 'Tagged" disks will only reload when you enter the code. Very useful for security.

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Now you have a selection of DOS commands available at all times - DIR, FORMAT, COPY, DEVICE, etc.

NEW
- **FILE REQUESTOR -**
if you enter a command without a filename, then a file requestor is displayed.
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Disk Copy at the press of a button - faster than Dos Copy. No need to load Workbench - available at all times.

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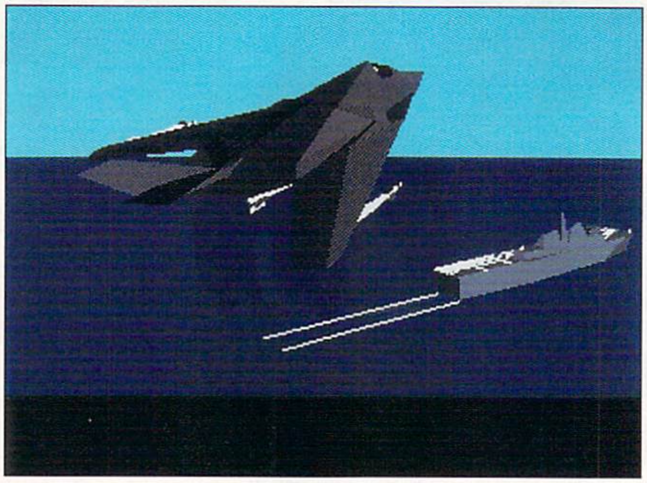
must choose among 12 mission types at four difficulty levels.

And, naturally, you pick a plane. Most flight simulators have only a handful of craft to select from. Birds of Prey has 27 Allied and 13 Soviet choices, including the 747 passenger liner, the C-130 prop-driven transport, the F-111 swing-wing fighter-bomber, and the experimental X-29. You can take a B-52H strategic bomber aloft, launch the X-15 rocket plane that's under its wing, and then fly that test-plane-as-missile into near space.

Unfortunately, all these planes have the same cockpit, but they perform with notable differences in flight, and that's the important thing. (The specs are laid out in detail, both in the program and in the last 66 pages of the excellent 188-page manual.)

So how does it fly? Well, I suspect that, at the higher detail levels, BOP would benefit from being played on a faster machine. But the frame rate is acceptable on an unaccelerated A500, and your Hawk Mk. 66—the British trainer that serves as the default craft—begins to zip a bit once that setting is reduced.

That's no great loss, either, as the designers—Jez "StarGlider" San's Argonaut Software—haven't gone out of their way to incorporate much surface detail. (There are, however, some lovely dithered skies and sunrises!) And BOP's invigorating



Forty planes await your command.

sense of speed doesn't rely simply on frame rate. Consider the fly-by feature used when on autopilot—your plane approaching the screen like a bat out of hell, to the accompaniment of the most thunderous engine sounds I've ever heard in a flight simulator.

In addition, Disk 1 of BOP has an astonishing introductory animation, whose speed and smoothness recall the demo for Psygnosis's forthcoming CDTV title, Planetside. Disk 2, however, is also bootable, so you can run the program without the intro. Nice touch!

The plane controls and information screens are also slick. The results of each key press are clearly reported on screen.

The program also has its share of oddities and rough patches. If you switch to side view when climbing, the plane appears to be descending. BOP's save-and-load pilot screen is slow. The hard-disk installation script doesn't work as advertised. (Electronic Arts has indicated that Argonaut plans to produce a bug-fix revision.)

Actually, I don't share the most frequent complaint I've heard—that the computer-controlled rivals aren't aggressive enough. For me—an experienced but not-very-good Amiga pilot—they were just tough enough. Besides, this is more of a flying game than a fighting game, and I loved zipping from one modest battle to the next.

Even after four years of work, BOP is not the ultimate Amiga flight simulator. Sorry; that is still to come. So forget what you've heard, and start over. Give Birds of Prey a chance. It's fast and it's fun. I think you'll like it.

## Battle Isle; Fireteam 2200

**By Neil Randall**

The only similarity between **Battle Isle** (*UBI Soft/Electronic Arts*, $49.95) and **Fireteam 2000** (*Sim Systems/RAW*, $49.95) is that they're both science-fiction war games. In operation, quality, and enjoyment, they're completely dissimilar. The enjoyment, unfortunately, derives from only one.

First off, let me get a gripe out of the way. Battle Isle is much too similar for comfort to a game called Military Madness, a 1989 TurboGrafx-16 game from Hudson Soft.

With that said, I must also insist that Battle Isle is an extremely strong game. It ►

Back in the February issue, I told you how to get around the dragon at the bottom of the dungeon—a nasty customer—but not the old wizard Mordamir who follows him. (And he's much worse, as you've probably guessed by now.) I know, I know, you set out to *save* Mordamir. But hey, life goes on, people change and you look at things a little differently eight levels down when your old master steals your protection against the dragon and stands across the chasm sending lightning bolts at you.

Don't lose your cool. Like your encounter with the dragon, this requires timing and the right equipment. Your statue spells can handle the lightning, and when Mordy switches tactics to Sonic Blast, use Sonic Protection. He'll then come back to lightning again, and you should be left with one statue to fend off the spectre he sends against you—almost done now. You don't need to attack him. Just invoke the Magnetic Hands spell to remove his defense (the amulet), and let the dragon do his worst.

• I Get Mail Dept.: By the way, thanks to everyone who wrote to let me know about the story branch in The Secret of Monkey Island (*Lucasfilm*, $59.95) that grows when you sink your ship with the native sculpture. No, it doesn't really affect anything, and, yes, it's worth trying for the fun of it.

Dan Collier, of Lake Wales, Florida, also filled me in on another scene I hadn't come across. It's apparently triggered if you steal the vase from the governor's mansion before completing the other two missions assigned by the Three Important-Looking Pirates. Dan indicates that if you get the meat from the kitchen at the Scumm Bar and the petal from the maze and then go directly to the mansion, the Gov and Guybrush have "quite a love scene" when Guy comes out of the water. Sheesh. Sounds like an Obsession commercial. Where that's saved-game file? Thanks, Dan!

By the way, you've probably noticed that I'm not dealing much with specific reader questions in print anymore (or even promising to answer 'em). I occasionally get mail like some people get firewood—"oh, just stack it up behind the house, Mr. Postman"—and

*Continued on p. 64.*




**HILL STREET BLUES** is the most honored series in the history of television with the stunning accomplishment of 26 Emmy Awards and numerous other international awards.

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Amiga screens shown. Pictures of the actual TV series have been used with permission from MTM Production. Available for A500, A1000, A2000, A2500, A3000 and other computer formats. Retail Price: **$39.95**. Visit your software retailer or call toll-free **1-800-783-8023** to order.

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completely dispenses with the unwieldy interfaces too often found on computer war games, offering instead a slick, joystick-only system of movement and combat, and even such niceties as repairs, information gathering, and strategic viewing. Those who regularly play SSI-style war games will find Battle Isle lacking some options, but in the end, these options aren't really missed at all.

In Battle Isle, you are in control of one force while your opponent or the computer controls the other. Your goal in each mission is either to destroy all enemy forces or—and this is more fun—to capture the opposing headquarters building. You play through a series of 32 missions, and you have to win each one in turn to progress to the next. Apparently there are two bonus missions as well, but I'm stuck in mission #22 and have yet to see them. UBI Soft promises add-on missions as well.

The strength of the system of missions is that it effortlessly succeeds in introducing you to an ever-increasing complexity. Each mission takes place on a unique map, and most of them include a type of unit that you have neither con-




Test your tactics in Battle Isle.

trolled nor opposed heretofore. As you move through a mission, you gradually learn how to fight with the new elements of your land, air, and naval forces, until, in the final missions, you must concern yourself with all of them at once.

The game itself is entirely joystick-controlled. Each map is divided into hexagons, and the joystick moves the cursor from one hexagon to another. When the cursor is on a hexagon containing an enemy piece, you can find out what it is, but not much more. When it's on one of your own units, you can perform one of several actions. By holding down the firebutton and moving the joystick up, down, left, and right, the cursor icon changes to signify each possibility. When you finally have the icon you need, release the button to perform the action.

One final strength of the game is that each stage of Battle Isle plays quickly and equally well against the computer or a human opponent. This is a superb late-night strategy game, with a very worthwhile system. You'll want to install this one on your hard disk.

Everything Battle Isle does right, Fireteam 2200 seems to do wrong. First of all, the main battle display offers some of the worst graphics to appear on an Amiga game. Not only are they unattractive, they're also counter-productive. Figuring out where your units are is tough enough; trying to decipher which way they're facing and what kind of terrain they're in is next to impossible.

The game's interface isn't much better. Its keyboard-only control is both unwelcome and downright difficult to use, and it takes an inordinate amount of time to learn how to perform crucial actions. Moreover, the computer updates the battlefield every six seconds, and during the updates (which themselves take a few seconds), you will find yourself hitting the keyboard futilely.

What is good is the game's premise and wealth of detail. Only the most dedicated gamers (who have one megabyte of RAM) are going to bother playing this thing for long, however, and then only if financial restraints mean they can buy no new games for a long while. Fireteam 2200 would be marginally acceptable on an old IBM-PC; on an Amiga, it's not worth the effort it takes to load it.

## THUNDERHAWK

**By Jeff James**

You take the controls of a high-tech helicopter gunship for some frantic target-busting action in **Thunderhawk** (*Virgin Games*, $49.99). You're not just any average helicopter jockey, however; you're an agent for MERLIN, a secret military organization commissioned by the United Nations. Your job is to fly to world hot spots and bring the irksome troublemakers to justice in this engaging mixture of arcade, role-playing, and strategic elements.

You start in the common room. From this location you can fly a flight simulator, view your combat awards, save and load games, or be briefed on your forthcoming mission. The war room supplies the strategic element: You have six theaters of war to choose from, including the Middle East, Southeast Asia, and Central America.

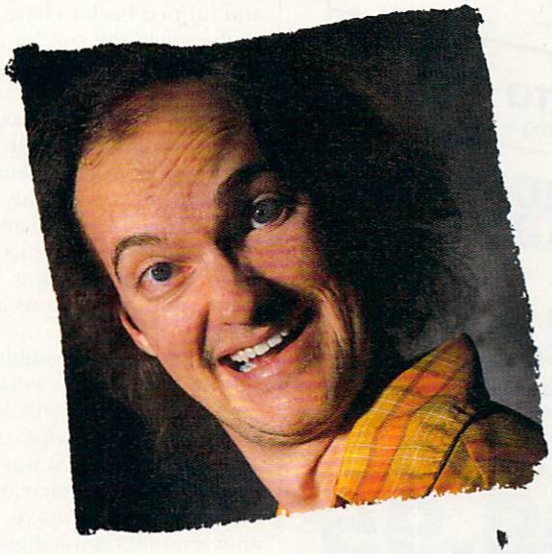
In the briefing room you're warned about the threats that you may meet in the combat area, usually consisting of SAMs, MIGs, and antiaircraft fire. Complete with a flickering black-and-white film of the target area and a curmudgeonly commanding officer, the briefings are a nice realistic touch.

Next, you select your weaponry, then take off from your airbase, which is usually near the target. In the air, Thunderhawk is a marvel. The frame rate is easily one of the fastest I've seen on the Amiga, with the landscape smoothly gliding under your craft. Granted, most of the landscape is rather bare (usually only a few hills, buildings, and such), but it's still a joy to fly over it.

Controls are simple: All the flying, target, and weapon selection is done with the mouse, while the ►



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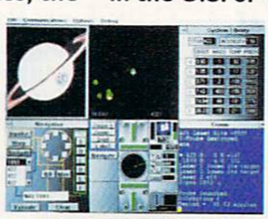
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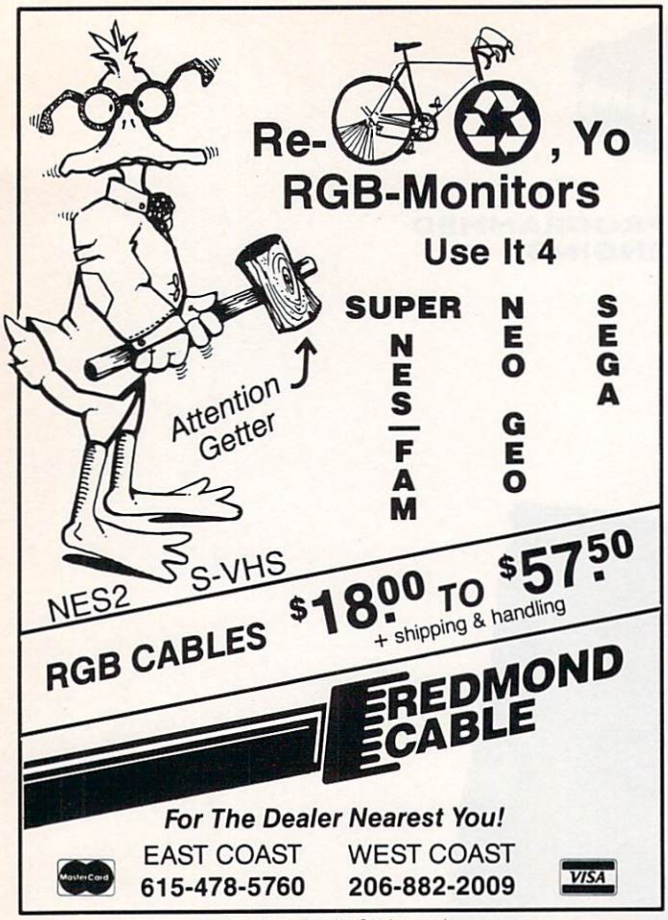
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toggling of night vision and your electronic counter measures (ECM) equipment (chaff, jammers, flares) is controlled by a handful of keys. Thunderhawk has managed to cut back on the overwhelming multitude of keyboard commands that you usually find in many simulators, and this makes for a lean and quick playing experience.

After you've pummeled your target into oblivion and limped back to base, you're given the rundown on how well your mission went. Then you're back to the briefing room for your next mission, filled with more challenges and danger. This format roughly continues until you've accomplished the missions in all six theaters, earning awards and promotions in the process.

I had no end of trouble getting this game to work on my A3000. I could only load it when running Kickstart 1.3, and even then it was prone to strange behavior, such as an unresponsive mouse and scrambled game screens. It did work fine on other Amiga models running AmigaDOS 1.3, although it did seem to have problems with the new AmigaDOS 2.04 ROMs found in A500s and A2000s.

Hard-drive installation isn't supported, and the disks are copy protected with disk-based and manual-oriented schemes. The requester for saving and loading games is another sore spot, seeming rather cumbersome and awkward to use. Finally, the lengthy opening animation cannot be bypassed—every time you reboot Thunderhawk, you must sit through it.

If it sounds as though I have mixed feelings towards Thunderhawk, I do. The fast frame rate, simple controls, and well-done briefing sequences are a joy to experience, and the sound is exceptionally well done. Unfortunately, it seems that Thunderhawk was rushed across the Atlantic (it was programmed by Core Design of the U.K.) without thorough testing on North American Amiga hardware.

If you have a fairly uncomplicated setup (no A3000, no AmigaDOS 2.0, no hard disk), Thunderhawk could be a blast. As matters stand, it shows a great deal of promise that is unfortunately frustrated by a cumbersome implementation.

## CORPORATION

**By Jeff James**

A magnificent mixture of a Dungeon-Master-style interface with a futuristic, hi-tech game world, **Corporation** (***Virgin Games***, $49.99) offers a challenging diversion from the hackneyed role-playing norm of ogres and hit-points.

In the hard-edged world of the 21st Century, the malevolent Universal Cybernetics Corporation (UCC) has begun illegal genetic experiments to create the ultimate killing machine. As a Zodiac agent, you must enter the 16-level headquarters of the UCC and return with evidence to prove the research is taking place.

Before embarking on your mission, you select a character from the two robots and four humans (two male and two female) available. You can outfit yourself with an impressive array of equipment: five handguns, four



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armor types, grenades, power packs, bombs, lock-picks, a backpack computer, a jetpack, and a plethora of other hi-tech gadgetry.

Corporation's approach to movement is ingenious; instead of clicking on separate buttons to move your character, a combined movement square allows quick and direct movement. Click in the center of the square to stop, at the top to go forward, at the bottom to go backwards, and at the sides to slide sideways. The farther you click from the center of the square, the faster you move.

A central view screen showing the action is flanked by two humanoid outlines that display your character's health and your equipment's status. At the bottom of the screen are the controls to click for object manipulation and movement.

Graphics are well done, especially the fluid, animated movement of your adversaries. Monsters don't simply appear or lurch toward you in the jerky gait of a looping animation. Using a method called "bitmap scaling," beasties that move toward you gradually become larger and more distinct, eventually filling your screen with hostility. All sorts of background sound effects add to the spooky atmosphere.

Gameplay is decidedly arduous; within moments of my arrival at UCC headquarters, I was beset by a horde of energy-spitting robotic spiders. In addition to the bestiary of robotic and artificial life forms that impede your progress, security cameras, pressure plates, infra-red warning devices, and dozens of other futuristic traps and pitfalls are waiting for you. For help, you can access such devices as computer terminals, elevator controls, and security access panels.

Corporation requires only 512K of RAM to operate, and although it isn't hard-disk installable, games can be saved to disk. The excellent introductory animation refused to work on an A3000, but the game itself ran fine. With its crisp presentation, challenging gameplay, and intuitive interface, Corporation is a role-playing experience not to be missed.

*From p. 58.*

**there's a very wide range to the questions therein. Questions about games released when the Amiga had 64K and a cassette drive (just kidding). Questions about things I've already answered—twice.**

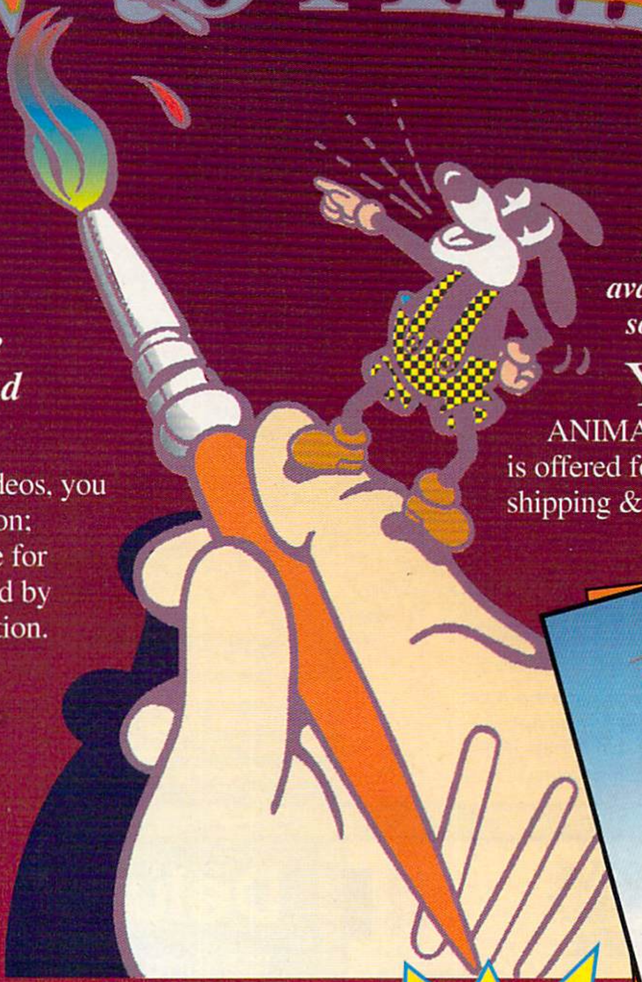
**So, I've decided to focus on a current game or two in the hope of helping as many folks as possible at one time. If there's something you'd like to see covered in this fashion, write and say so. If I can, I'll do it. (I've had a few votes for The Immortal and The Jetsons already.) If I can't...well, I can always use more firewood (grin).**

**I've also been getting the occasional letter from folks who are evidently playing illegal copies of games. (They're asking questions that either concern copy protection or that indicate they don't have the docs.) Naughty, naughty. Coincidentally, all these questions have exactly the same answer: Put the pirated disk in df0:, select it with the mouse and choose "initialize" from the Workbench menu. Your computer will solve the problem for you.**

**If you're having trouble with a game—"I can't get the dice into that little slot"—you can write to me at: 25 Belmont Ave., Madison, NJ 07940 or send electronic mail to Peteroo on GEnie and Portal and 74160,3053 on CompuServe. ■**

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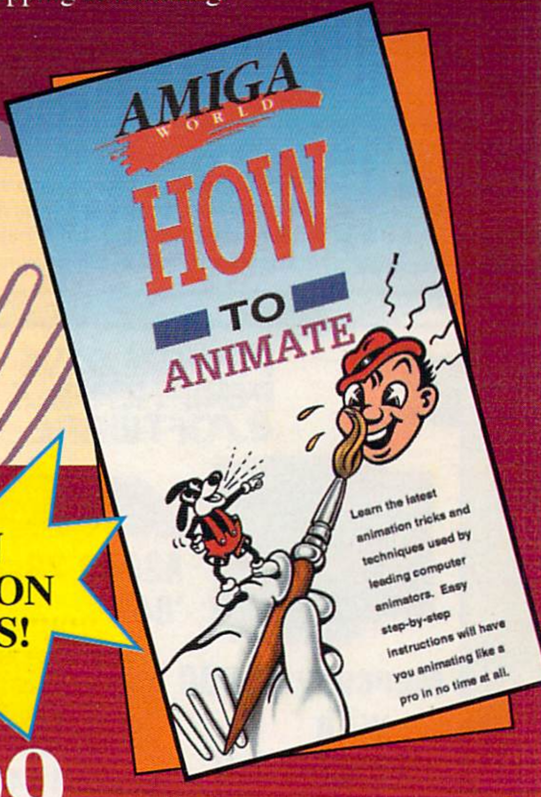
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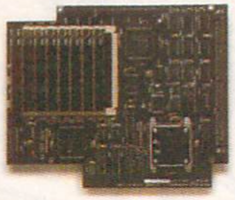
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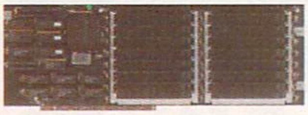
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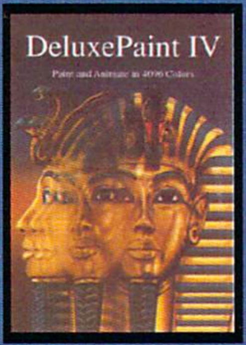


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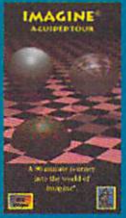
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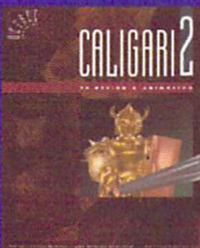


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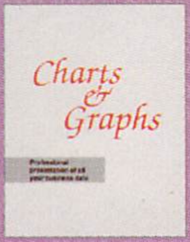
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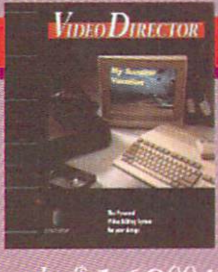
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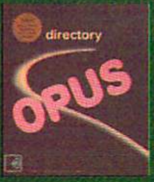
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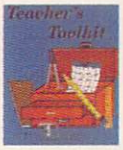


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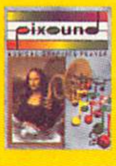
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*From p. 26.*

## MegaChip 2000/500
## MultiStart II
## SecureKey

**DKB Software**

*Add flexibility and security to your system.*

**By Michael Hanish**

LONG LIVE THE entrepreneurial spirit! ***DKB Software*** has recognized three needs of Amiga users and filled them with effective, simple, and inexpensive hardware solutions.

### Solution #1: MegaChip 2000/500

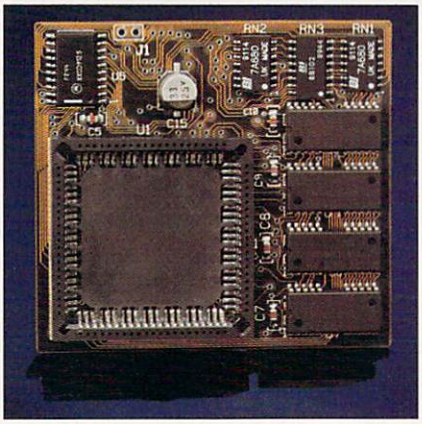
Until the release of the Enhanced Chip Set (ECS), the maximum amount of chip RAM (the section of memory used for graphics and sound processing) available to Amiga 2000 and 500 owners was 512K. With the ECS Agnus installed, A2000s and A500s can access one megabyte of chip RAM, but they still lag behind the A3000, which, with its special circuitry and ECS Agnus, can access two megs of chip RAM and manipulate more and larger graphics and sound files. **The MegaChip 2000/500** ($299.95) evens the score.

A daughterboard that plugs into your A2000's or A500's Agnus socket, the MegaChip 2000/500 gives you up to two megs of chip RAM. The board comes populated with one meg of memory, but you must supply the A3000 two-meg ECS Agnus chip to drive it.

Installing MegaChip is most definitely not for the faint of heart. (Being somewhat of a hardware wimp, I enlisted the help of an authorized service person. Plus, opening the case yourself voids your warranty.) Believe the manual when it says removing the original Agnus from your motherboard witnout the proper chip-pulling tool is next to impossible. It is all too easy to destroy the socket by trying to pry the chip out. Not having the correct tool, we removed the chip by stripping the machine down to the motherboard, removing it, and gently pushing the chip out from below. This works, but is *not* recommended. Details of the rest of the installation vary according to the model and configuration of your Agnus.

Follow the steps that are thoroughly described and clearly illustrated in the manual, then double-check your work before reassembling the machine. When you reboot your upgraded Amiga, open a Shell and type AVAIL. If you were successful, the amount of available chip RAM listed should be slightly over the two-meg mark.

In operation, MegaChip is completely transparent, except that it gives you more space to perform graphic- and audio-intensive operations. With it, you can have up to ten megs of RAM instead of the previous limit of nine. The MegaChip board was recently redesigned into a smaller size, both for easier installation and greater compatibility with a wider variety of add-on boards and configurations. It works flawlessly under Workbench 1.3 and 2.0. Without doubt, this is one of the best and simplest hardware improvements you can make to your system's performance.



MegaChip gives your A2000/A500 two megs of Chip RAM.

### Solution #2: MultiStart II

While many users want the power and flexibility of the 2.0 operating system, they also need 1.3 to run favorite older programs or games that break under 2.0. **MultiStart II** ($59.95, without ROMs) lets you install and use both 1.3 and 2.0 in A2000s and A500s. Your choice of the default ROM for booting is determined by a simple jumper placement or by which ROM you insert in which socket.

Installation requires removing the old ROM from the motherboard, inserting it and the new ROM in MultiStart II, and working the daughterboard into the motherboard's socket. All the options and other installation details are thoroughly covered in the manual. Be careful, however, of two problem spots: First, the pins on the MultiStart II board seem fragile, so seesaw them carefully into the ROM socket. Second, the installation, as with MegaChip, involves attaching a clip to a particular pin on the Gary chip. In the version I used, the clip's wire is about two inches too short to make a neat run attachment; it's a tight fit in an A2000, but it reaches. DKB says it has lengthened the wire by about an inch on the newer models. Make sure to check all your work before reassembling the machine.

> *YOUR TURN:*
>
> Installation of the MultiStart II card on my A500's Rev 6a motherboard was a bit more demanding than I anticipated. The original MS board I received worked on a Rev 5 or lower. The DKB service tech was very helpful, and the new board arrived promptly. Unfortunately, the installation manual was not updated, and no addendum was included. After following the original instructions and receiving a blank, fuzzy screen at boot-up, I eventually discovered that the board had to be configured for A2000 operation, not set for the A500. I have had no problems, since. The board works great.
>
> ***Jeff Crystal***
> *Houghton Lake, Michigan*

To run with the option of using either operating system, you must modify your hard-disk layout and startup-sequence. (The manual clearly covers both alterations.) Basically, the default system stays where it is on Workbench, and the second system resides in a drawer. The new startup-sequence checks to see which ROM is active, makes the proper assignments, and executes the appropriate startup-sequence. Changing systems is as simple as holding down the Control and Amiga keys for five to six seconds. I have never had a problem running MultiStart II, and I recommend it highly if you need to access both operating systems.

### Solution #3: SecureKey

Need to lock up your data? **SecureKey** ($124.95), a card for the A2000 or A3000, lets you boot only after you enter a password. The board slides simply into one of the 100-pin slots, an easy and well-documented installation. When you power up the computer, you are confronted with a screen asking for the password.

The first time you boot, you enter your new password, verify it, and proceed. After that, on each power up or warm boot, you have three tries to get

it right, after which you are denied access. To try again, reboot. You can change the password at any time; just enter the old one, and then its replacement. One word of caution: Make sure you have a record of the password in case you forget. There is no way to recover it from the card, but registered owners can get a new key from DKB. This board, like DKB's others, works flawlessly and transparently.

All three boards are simple and elegant hardware solutions to system needs, doing exactly what they promise. DKB's technical support will be there for you if you have any problems, but you probably won't. I highly recommend these three products.

## MediaShow

**Gold Disk**

*Put it all on the line.*

**By Greg Morris**

IF YOU LONG to do multimedia stints but face budget restrictions, **Media Show** ($129.95) from ***Gold Disk*** is worth a look. With this scaled-down version of ShowMaker (Gold Disk), you can combine pictures, animations, music, and sound effects for complete video productions without complex—and expensive—equipment.

As in its full-featured brother, MediaShow's heart is the scene window, which displays a timeline containing the video, title, music, and sound-effects tracks. The timeline, in conjunction with other event-parameter windows, lets you not only coordinate events, but also specify effects, fonts, and other options.

For example, to display some previously digitized video or Amiga-generated graphics, you add a video event to the timeline: Simply click on the track labeled "Video" and drag the mouse pointer to the point in time where you want your video event to end. Once you release the mouse button, a requester appears asking you to select the file for this event—either a picture or animation file, as there is no support for incoming live video. Next, a video-event window displays information such as the resolution of the picture, how much memory it uses, and a reduced version of the image. Additional video-event options include several wiping effects, and, for animations, the speed of playback.

If you want to overlay titles on top of video events, simply add a title track into the scene window in the same manner as the video track. You can select type style and size, as well as what effect, color, and motion to apply to the text. Once you make your selections, you can enter several lines of text directly into the title-event window. The Preview option lets you see how your current selection will look when the entire production is played. If you don't like what you see, it is very easy to modify it and try again.

### The Sound of Music

In addition to pictures and titles, you can add music files (IFF SMUS) to the timeline in the music track. When you select this track, the music-event window appears, allowing you to specify the tempos, looping options, and locations of the instruments used. Unfortunately, you must specify where the instrument files are located every time you add new music, even if the instruments are always in the same place. It would be nice to have some kind of default option for locating instrument files.

You can add sound files to any one of the four specific outputs found in the scene window. There are tracks labeled L1, L2, R1, and R2 for the two left and right audio channels, respectively.

Once you have made all your selections, click on the Play button and experience either your entire production or just a portion of it. During the testing of this feature, however, the image movement was a little jerky at times in some of the display updates on my three-megabyte, unaccelerated Amiga 2000 (no disk access was involved, either). This problem could be solved with an accelerated machine, a solution I support for professional use. Another drawback for professionals is the inability of the program to control video recorders, which is a strength of the more expensive ShowMaker. You can, however, record your presentation to videotape by using a standard genlock.

Editing a production is very easy to do. You can highlight events and copy, delete, or shift them in time, much as you would perform cut-and-paste operations in a word processor. There are three ways of editing: You can move one event in time and not affect any other events; move a particular event on a track so that all the other events are adjusted accordingly in time; or move all tracks as a group. Additionally, if the mouse pointer is not specific enough, you can adjust starting and ending times more accurately through special gadgets on the scene window.

Even though entering information on the scene window was easy, the response to my mouse selections was a bit sluggish on my unaccelerated machine, especially when I was dragging the mouse pointer along the timeline while adding or editing an event. There is also a delay before a production begins while the program preloads several picture and sound files into memory. Even performing a minor change to the production causes the program to load everything into memory again, even the files that you did not update. This adds a lot of time when you're trying to make adjustments. What's more, there is no undo option, so once you make a change, there is no turning back.

There were a couple of other unusual things that I noticed with version 1.11 of MediaShow. Just after loading a saved production, I saw that on the Edit menu the selected edit-mode option doesn't always match the event window's edit-mode box. Once you load your production, however, selecting a different edit mode (through either the menu or event window) keeps the two synchronized.

### Don't Believe Everything You Read

As far as the user manual is concerned, the on-disk ReadMe file explains that several changes were made in the software since the manual was printed. There is some resulting confusion, because most of the pictures in the manual showing the scene and event windows do not match what you see on the screen. I hope future manuals will more accurately reflect what you see on the screen. Other than these outdated pictures, the manual does a good job of explaining how to install and use the program. It takes you step by step through creating a production, and it is augmented by on-disk tutorials.

As an added bonus, Gold Disk includes two separate programs called Paint and Music. These provide you with the basic tools needed to create picture and sound files for use in the MediaShow program. These programs do not contain the elaborate features offered in other well-known drawing and music programs, but they work if you have no alternatives.

MediaShow is a very easy-to-use program for creating sequenced video productions for display on your Amiga. The learning curve is minimal, and you will be very quickly on your way. ►

However, because of the lack of smoothness in some of the video displays and the sluggish response during timeline manipulation, the program doesn't live up to its full potential on a stock Amiga. For home productions and other small projects, by all means consider MediaShow; but for professional use, I would look elsewhere.

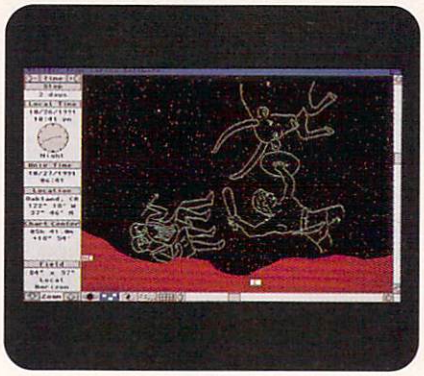
## VOYAGER, THE DYNAMIC SKY SIMULATOR

**CARINA SOFTWARE**

*A good tool to complement your telescope.*

**By Gene Hamm**

IF YOU'VE EVER wanted to view an eclipse without going blind or watch the stars all night without freezing to death, then **Voyager, the Dynamic Sky Simulator** ($124.95, *Carina Software*) is the program for you. A friend of mine had to go to Baja Mexico to see stars as clearly as Voyager shows them.



**Voyager lets you see such sky figures as the Bull, the Hunter, and the Twins.**

It's like having a planetarium on your Amiga. You can gaze at the stars and planets as they would appear from any location on the Earth or in space, and you can go forward or backward in time to see how the universe changes over millennia. You can even look at the Big Dipper from such a remote point in time or space that it doesn't look like the Big Dipper any more. For serious astronomers, three optional Sky Data disks are chock full of additional stars if those on the Voyager disk aren't enough.

When you load the program, you see a sky full of stars, each one about a pixel in diameter—so small that they could be flyspecks on your monitor. Center the cursor on any one and click the mouse button to call up a display box that has more information on that little flyspeck than you probably want to know.

Interested in another star? Horizontal and vertical scroll bars and zoom control buttons allow you to move freely about the sky. You can bypass the zoom buttons by holding down the left mouse button and dragging a box around any section of sky you want to see at closer range. If you want to see the stars from your backyard, you can custom design the horizon to imitate your immediate surroundings. For realism, you can make the ground opaque, or, to see through the Earth, you can make it transparent.

You can fix on one star and track it all night, or fix on the horizon and watch the sky rotate around you. Control buttons turn on displays of planets, stars, deep sky objects (galaxies and so on), outlines of constellations, and grid lines. These can be viewed separately or all at once. The more that is displayed, the more your machine slows down, but the speed at which pictures are shown is still remarkably fast. If you find an especially interesting screen, you can print it, and in doing so you can save wear and tear on your ribbon or toner cartridge by reversing the colors to output black stars on a white sky.

### IT'S ALL HOW YOU LOOK AT IT

You have a choice of four view modes for seeing the whole known universe at once. The Star Atlas view shows it in the form of a flat map, while the Local view adapts the Star Atlas view to display the universe as it would appear from your local position on Earth. In the Full view, the universe resembles a mural that scrolls horizontally in an endless loop, as if it were going past your car window. The Celestial Sphere view is a fish-eye 180-degree display of one-half of the sky, and this is the most cosmically mind-blowing panorama in the Voyager program. I'm sure the programmers intended you to feel as though you were inside a dome, but because concave and convex are perceived subjectively, I feel I am *outside*

*Continued on p. 88.*

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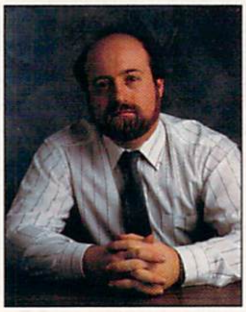
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# HELP KEY

*On Lou's agenda this month are accelerator, coprocessor, and digitizer choices, plus a 2.0/AmigaBasic problem.*

By Louis R. Wallace

## Thrifty Digitizing

**Q:** *I want to digitize video. I'm not rich, and I was thinking about NewTek's Digi-View Gold or Digital Creations' DCTV, but I really have nothing to refer to as far as the ins and outs of digitizing hardware and software are concerned. I want to do general stuff such as making digital pictures of my family and scenery, with the ability to save and print out the pictures. It would also be nice if I could overlay pictures, that is, digitize a background and overlay someone's face in the picture. Could you give me some advice? Can I do both with a low-budget system?*

***R. Fleming***
*USMCA*

**A:** Actually, both digitizers (DCTV and Digi-View) will work. Digi-View, when combined with Digi-Paint, allows you to digitize images and then edit and composite them in the Digi-Paint HAM paint program. DCTV also lets you digitize images, and it comes with an even better paint program, called DCTV Paint, as well as other utilities. In addition, DCTV has several significant advantages over Digi-View. The most important is that it can output a high-quality composite video signal that gives you more colors and higher resolution then the normal Amiga display. And you can use it to play animations in real time that take advantage of the additional colors and resolution. Both are good, but if I were forced to choose between the two, I would pick DCTV.

## AmigaBasic/2.0 Incompatibility

**Q:** *I have installed AmigaDOS 2.04 on my A2000. It is equipped with the GVP 68030 accelerator card, a hard disk and several megs of RAM. I have tried to use AmigaBasic, but with even simple commands like INPUT, the screen blinks black when the program is run, and then nothing else happens. Is there a problem with the GVP 68030 card and AmigaBasic? Or is there something wrong with my computer?*

***J. Watson***
*LaVerne, Calif.*

**A:** The answer is elementary, my dear Watson. It is neither your GVP accelerator nor your computer. The culprit is AmigaBasic itself. AmigaBasic does not, repeat, does not, work properly under AmigaDOS 2.0. There are a number of other problems and bugs besides the one you report, and CATS (Commodore Applications and Technical Support) confirms that AmigaBasic is not AmigaDOS 2.0-compatible. Furthermore, at this time there are no plans for Microsoft to upgrade the language to be 2.0-compliant.

There are, however, other Basic-like languages available that can fill the void left by AmigaBasic. Examples are AMOS, HiSoft Basic, AmigaVision and The Director. HiSoft is quite AmigaBasic-compatible, and both AMOS and The Director could be used to recreate even better versions of just about any AmigaBasic program. And if you already know Basic, you will find that learning to write programs with AmigaVision is quite easy.

## Speeding It Up

**Q:** *I am considering the purchase of a 68020 accelerator for my stock Amiga 2000. What would be the best coprocessor to go with it: a 68881 or 68882? The use will be to speed up 3-D rendering somewhat. Are there any resulting hardware or software conflicts with this upgrade?*

***T. Mitchell***
*Cupertino, Calif.*

**A:** There are always some compatibility problems when using accelerators. Games are the biggest culprit, as they often use "illegal" tricks and techniques to wring every bit of performance out of the machine, and they frequently have copy-protection schemes that break down on processors other then the 68000. However, Commodore has long had programming guidelines available that, if followed, usually allow software to work properly on any processor. Luckily, most companies have followed those rules, so the vast majority of software works just fine on accelerated machines.

However, I must advise you to skip the 68020 card unless you are getting an exceptionally good deal on the hardware. When compared to the performance of today's 68030 and 68040 technology, the 68020 is not very cost effective. There are very good buys available on 25-MHz 68030 cards for the A2000, as well as on 40- and 50-MHz 68030 cards. And there are now several high-performance 68040 boards for the A2000 that are even faster. As an added incentive, these 68030 and 68040 cards allow you to exceed the A2000's original nine-megabyte memory limitation, a very important factor for 3-D designers and animators.

As for which math coprocessor to get, I'd definitely go for the 68882. It is significantly faster than the 68881, resulting in faster 3-D renderings.

## Update

For those 3-D animators interested in checking out the Studio BBS mentioned in the Feb. '92 Help Key, be advised that the telephone number was changed in early March. The new number is 817/557-2111. ■

# THE ONLY 16Mhz '286 IBM PC/AT® EMULATOR THAT WORKS WITH BOTH THE A500 AND THE A2000




***If you want your Amiga 500, 500+ or 2000 to be able to run software programs that were originally written for the IBM PC, GVP and Vortex have the perfect solution—the ATonce-Plus PC/AT emulator board.***

But before you buy any emulator here are a few key facts you should know . . .

- **FACT:** **ATonce-PLUS** is the only PC emulator board with a powerful 16-bit 80286 CPU running at the blazing clockspeed of 16Mhz.
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- **FACT:** **ATonce-PLUS** comes with its own 512KB of RAM and allows the Amiga's memory to be (transparently) allocated to MS-DOS applications requiring more than 512KB of memory. Amiga FAST RAM can even be used as extended memory!
- **FACT:** **ATonce-PLUS** can take full advantage of the 80286 CPU's protected mode and allows MS Windows to run in "standard" mode. This is not possible with other emulators using 8-bit wide bus CPU's.
- **FACT:** **ATonce-PLUS** operates under AmigaDOS, so you can run AmigaDOS and MS-DOS applications concurrently!
- **FACT:** **ATonce-PLUS** supports Hercules, CGA, EGA/VGA (monochrome), AT&T 6300 (640x400) and T3100 video emulations.
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- **FACT:** **ATonce-PLUS** allows the Amiga's built-in floppy drives to be used to read and write MS-DOS compatible floppy disks.
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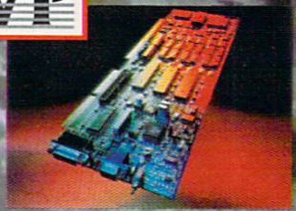
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*From p. 76.*
the universe, looking at the celestial sphere floating in a sea of blackness. It's a humbling experience to see the universe looking so finite and fragile.

For perspectives closer to home, try the Solar Neighborhood display and Planet Gallery. The first shows the sun with its 60 nearest stars. Clicking on the big arrow buttons rotates the stars left, right, up, and down around the sun. If you activate the Trail buttons before you click on the arrows, the stars leave a visible path behind them as they move. The Planet Gallery views individual planets up close, although the only detailed planet is the Earth (after all, we've explored it the most). Click the Time buttons to animate a planet forward or backward in time. Viewing Saturn in this manner, for example, reveals the wobble in its rings.

The Day-Night map displays the Earth laid out flat with the light and dark areas appearing as a horizontally stretched yin-yang symbol. Activating the day cycle animates the shadow across the map through the course of 24 hours. (Check this before you make an international call, so you don't wake someone up and get sworn at in a foreign language.) When you activate the year cycle, the moving shadow drifts downward and then back up, so you can graphically see why they say the nights are six months long at the poles.



*YOUR TURN:*

While not as visually striking as Distant Suns (Virtual Realities Laboratories), Voyager makes up the difference with outstanding accuracy and professional features. Especially useful is the ability to measure angular separation. Here at the Abrams Planetarium, I use Voyager to plot accurate maps and Distant Suns to create beautiful star fields for video.

***Doug Murphy***
*East Lansing, Michigan*

For more information on our nighttime neighbor, consult the moon map, which shows all the moon's craters. Just click on a crater to see its name or number, longitude, latitude, and diameter. If simply viewing the moon at 80-times magnification isn't close enough, then you can look back the Earth from the point of view of the moon. You can even see the moon's shadow pass over the Earth.

For a more wonder-filled and less scientific view of the sky, you can superimpose mythological sky figures, such as Orion and the Big Bear (Big Dipper) on their appropriate constellations. The 12 zodiac figures are included, as well. For those with an astrological bent, Conjunction Search finds dates when planets line up, as well as the times of eclipses and full moons, which could be useful in making personalized star charts. (An enterprising astrologer could make a lot of money using Voyager.)

Usually I prefer to create my own explorations rather than watch demos, but Voyager has several great ones—Halley's Comet, several nice eclipses, a few satellites, and sunset in Hawaii—that you can customize. The Hawaii demo shows the sky growing dark as the sun goes down in the west, then lets you turn around and watch the sun rise again in the east.

### Cosmic Rifts

Although I recommend Voyager as a fine educational tool for school or home study, it could be better. Taking a lesson from Broderbund's Where in the World is Carmen SanDiego?, which includes a world atlas, the Voyager manual should include at least a glossary of astronomical terms for those of us who thought a Messier Object was simply worse than a messy object.

The Image Sampler disk is full of incredibly beautiful digitized astronomical photographs, approaching the picture quality of the *National Geographic.* The manual recommends that you view them in DeluxePaint, but this is an ordeal, because every time you load a picture, you must change the screen size. All the pictures should be the same size, or at least grouped by sizes in separate drawers. (One remedy is to use another viewing program.)

I have saved the biggest annoyance for last: When you try to save a screen as an IFF file, it saves the requester on top of the screen—so much for loading a sequence into DeluxePaint III and creating an ANIM. The people at Carina Software's friendly help line told me they had received several ►

Circle 44 on Reader Service card.

complaints about the save-screen function, and they sent me an updated version with the bug fixed in exchange for my original disk.

Despite these shortcomings, Voyager should prove satisfying to children, nonastronomers, novices, and serious astronomy buffs for years to come. Install it on your hard drive and go exploring.

## Notebook

**Black belt Systems**

*High school meets high tech.*

**By Dave Johnson**

"ECOLOGICALLY FRIENDLY paperwork for the Amiga," proclaims the packaging. While vague, it is as apt a description as any of ***Black Belt Systems'*** **Notebook** ($39.95).

In somewhat more concrete terms, I describe Notebook as a free-form idea organizer that allows you to combine text, IFF graphics, and structured drawing doodles in a package that mimics the concept of a lined, three-hole notebook.

Notebook opens on a high-resolution, interlaced screen. The right side contains a variety of control icons, while the rest of the screen displays the actual workspace—an authentic-looking version of the notebook you probably used in high school.

### Digital Doodling

To begin a new notebook, simply click on the icon that adds pages to the initially empty document. You can control the appearance of each page and add or delete sheets at any time. Do you need lined, graph-ruled, or blank pages? With or without binder holes or a vertical rule? Grid snap may be enabled even when the paper is not in "graph" mode.

Notebook accepts text in two ways. You can begin typing anywhere on the page or import ASCII text onto the ►




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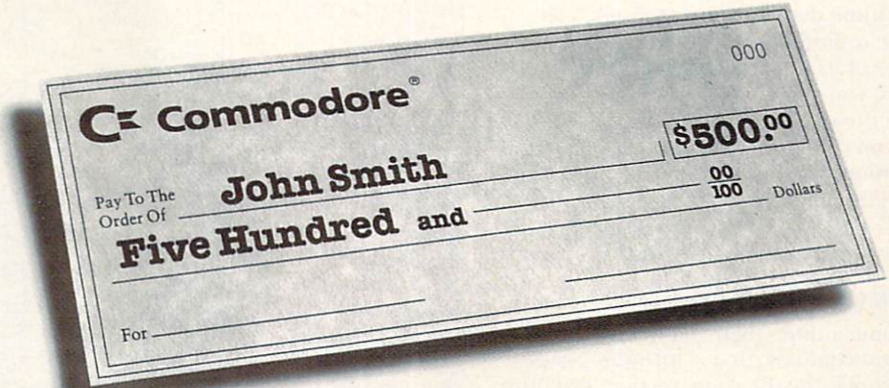


*YOUR TURN:*

At a street price of $25, Notebook is great. I like the fact that you can draw and write on a page. Most of my thinking is done by drawing flow charts.

*Tom Miller*
*Casper, Wyoming*

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page. If text flows beyond the current page, Notebook adds pages as necessary until all of the text has been rendered. Notebook lets you type with any nonproportional system font, so you aren't restricted to basic topaz or a single typeface. If, perchance, you write something that is particularly important, consider highlighting it. Notebook offers four marker colors for highlighting text and other objects.

To spice up your pages, you can import graphics of any standard Amiga IFF format into your notebook. The program converts the image to a dithered, four-shade grayscale and renders it on the page in a box you draw with the mouse. The conversion and scaling is fairly snappy, and the final result usually looks surprisingly good.

What use would a notebook be if you couldn't draw in it? A full complement of drawing tools allows you to add rectangles, circles, lines, freehand shapes, and the like. You can leave them unfilled, or you can fill them with any of 36 dithered colors.

One of the nicest aspects of Notebook is that all of these components are treated as structured objects. Thus, you may later move, resize, or change the color of anything you draw, as well as combine it into a group with other objects. In addition, you can move objects in front of or behind others.

### Tabbing Around

Now that you've stored some data in your notebook, you probably want to be able to find it quickly and easily. Notebook carries the analogy of its paper cousin to the logical extreme: For easy access, you can mark pages by placing paperclips anywhere on them. You can then add or delete these at any time, and you can skip directly to clipped pages at a single click. In addition, you can add labeled and color-coded tabs to page margins. Clicking on a tab takes you instantly to that page. Overall, Black Belt has put as much thought into navigation as into actual page creation.

### Putting a Notebook on Paper

Of course, there may come a time when you want to break a notebook out of its digital confines: that is, print it. Notebook lets you print notebooks by the page, section, or entire document. Output is scaled up so that each notebook page becomes 8 1/2×11 inches, rather than the size of the smaller, on-screen replica.

Unfortunately, output is Notebook's Achilles heel. Despite the fact that drawing elements are structured objects, they do not render at your printer's highest resolution. Rather, they look like bigger and jaggier versions of what you see on the screen. Text, too, gets the short end of the resolution stick.

On the other hand, Notebook prints aren't quite what you'd pass out at a board meeting; Notebook is a personal idea processor, and the printouts are meant to be personal as well. Regrettably, the output quality probably ensures that they'll stay that way.

What is the bottom line for Notebook? It is an innovative product that just about everyone who owns a computer can find at least six good uses for. It is the sort of program that causes you to say, "Why hasn't anyone done this before?" Thanks to its speed, fluid interface, and a plethora of other little conveniences, you'll find yourself using it often. Remember that Notebook always runs on an interlaced screen, so a display enhancer is just about essential. That and the print quality not withstanding, my advice is to buy this one; you can't go wrong. ■

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SERENE SHOOT UP A050 Another quality game for fire button freaks!
SEVEN TILES A047 Superb futuresports speedball type game
SHAPES A187 Very intriguing, mind-boggling puzzle game
SIMON & SPACE MATHS A173 Two good educational programs here - recommended
SIMPSONS GAME A052 A vertical scroll game done in SEUCK
SNAKE IN THE GRASS A197 Collect mushrooms and toadstools!
SOMETHING FOR NOTHING A130 Full of video utils, fonts etc., although you'll have to pay us the cost of the disk! (2)
SOZOBAN 'C' A131 Another popular 'C' programming environment, great for learning this powerful language
SPANISH TUTOR A175 Good language learning program
ST EMULATOR A132 Run Atari ST software on your Amiga - needs 2 drives - very useful if you have access to ST progs!
ST-80 BEAST SAMPLES A208 Pan flute sounds from Beast, Beast II. Some of the best Psygnosis sounds created to date
STAR TREK NEXT GENERATION A053 Strategy game in Hires, needs 1Mb, but well worth the extra memory!
STAR TREK THE SHOOT-EM-UP A054 The classic done in SEUCK, and a pleasant change from Trekkie 'simulations'
STORYLAND A071 Two very good kids' games, great fun
SUPER SKODA CHALLENGE A066 Nice new car racing game
SUPER WORKBENCH A134 Yet another alternative workbench! Fascinating how programmers spend their time!
SUPERKILLERS A133 Kills 190 viruses stone dead
TAROT II A150 Read the cards - great version (2)
TENNIS A055 An excellent tennis game, needs 1Mb
TEXT ENGINE A151 Another good quality word processor
TEXTPLUS A135 One of the best word processors, includes spell check and numerous extra faclities for the experienced
THE EVIL DEAD A056 Blast the ghoulies in this crazy game
THE INSIDERS' CLUB A058 Good stock market game - see how far you get! Gives you an insight into the markets...
THE JAR A057 Very nice little jump and run game
THE WOODEN BALL A171 Great shareware game, get this one! Another favourite with our English cousins just now (1Mb)
TILE TRIAL A174 Solve the sliding puzzle within the time limit!
TOMCAT A065 Good quality vertical scroll arcade game
TREASURE SEARCH A161 Find the buried treasure in this fun game- another good program on our recommended list
TV GRAPHICS A136 Superb DPaint backdrops and some great fonts - get this if you're into Toasters and video etc.! (2)
UEDIT A137 Another great shareware wordprocessor
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VIDEO APPLICATIONS A141 Assorted programs for genlock & video applications - must have this (2)
VISICALC SPREADSHEET A142 Easy to use spreadsheet based on VC
WAR OF THE FOUR A191 A good shareware graphical adventure game - hours of amusement here
WASTELANDS A069 Superb new 3D vector game - you MUST get this one! Absolutely superb!
WATERMINES A059 Good Boulderdash style game
WET BEAVER GAMES A060 Version of the old Pong game
WINDOWSBENCH A143 A Windows3/Workbench2 lookalike, very nice! Spruce up your Ami (2)
WIZARD'S DOMAIN A189 Nicely done graphical adventure game
WIZZY'S QUEST A062 Great arcade game from Germany
WONDERSOFT GAMES A061 Golf, Congi, Missile, Trillon, Windmill etc. Gotta gettit!
WORDWRITE WORDPROCESSOR A145 Comprehensive, with spelling checker, and all the full-blown features of some commercials
WORKBENCH HACKS A144 Loads of amusing fun with these hacks! This is another definitive must-have disk - funny stuff
YAMAHA DX7 VOICE FILER A209 Librarian program
YELP! A063 Nice little painter type game with surprises!
ZEUS A064 A very intriguing block puzzle game
ZX SPECTRUM EMULATOR A146 For the Sinclair (Timex) with sound! The Spectrum was the UK's most popular at one time
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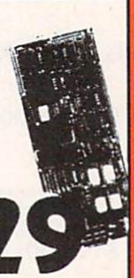
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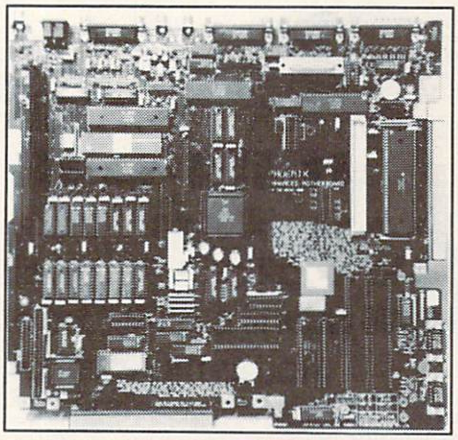
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**FD67: Arcade** - Includes Llamatron a well-done 'Robotron' clone. Hate is a "terrific" commercial grade Zaxxon clone with multiple levels/worlds and smooth diagonal scrolling...a 10!

**FD64: Games** - Wizzy's Quest - a "great" 50 level game with great graphics, Cubus - a 3-dimensional Tetris type game (rotate and move in 3 dimensions). Husker Du - Colors and pattern rather than shape in this Tetris-esque game; 5 screens and 3 levels of difficulty. Requires Fat Agnus (1 Meg of Chip)
**FD62: PomPom Gunner.** An extremely smooth and well done World War II gunner simulation. Requires 1 megabyte of memory.
**WB112: Productivity/Business** - Stock Analysis allows automated downloading of stock data with full analysis capabilities (requires modem). SubStore will allow you to log magazines and articles with full search/scan/print capabilities.
**WB111: Cellular Automa** - Straight from the pages of the January 1990 issue of Scientific American, this electronic model will allow you to simulate cellular circuits.
**WB110: Electronic Baby Book** - Immortalize your children on your Amiga! Tracks everything about your newborn—first steps, words, tooth, birthdays, X-mas, friends, etc—even space for a digitized photo!
**WB109: VerseWise** - Display, search and output The New Testament to text files or your printer.
**WB108: OctaMED** - This breakthrough program doubles your Amiga's sound capabilities from 4 channels to an ear-popping 8 channels! All the renound editing capabilities of MED plus 4 more channels! If you thought your Amiga sounded good before...you aint heard nuthin' yet!
**WB107A&B: Educational** - Drawmap is a program that generates representations such as hemispherical views, and orbital views of the Earth's surface, complete with national boundaries. Screens can be printed or saved to disk as standard IFF files. Full user-configurable online help facility. 68020+ version included. 2 disk set, counts as 1!
**WB106: Home Manager** - This is a great all-in-one address book with an autodialer/notepad/to-do list/appointment scheduler/home inventory database and phone number dialer.
**WB105A&B: Workbench 2.0 Extras #2** - See the top right of page 2 for more info on these priceless utilities to make Workbench 2.0 fly!
**WB104: GrabBag** - Q&A Trivia (requires AmigaVision) is a trivia game for 1/2 players...add your own questions to customize the difficulty level! Sysinfo is great for telling you how fast/slow your computer is, what boards are installed, chipsets, etc. AmiGazer will plot stars in the heaven from any position on earth complete with magnitudes and constellation identification.
**WB103: Music** - Contains 12 "great" Soundtracker/MED music MODules...complete with programmable/shuffle player...8 bit audio never sounded so hot! Two disk set counts as two.
**DD84: Proteus BBS** - This disk contains the full-blown version of the Proteus BBS software. Totally configurable & ultimately powerful. Requires a hard-drive, ARexx and at least a meg of memory.
**DD83: IBM** - Not one, but *TWO* IBM emulators that will allow the running of MS-DOS software *with* Amiga programs!!! Comes complete with programs to turn your Amiga floppy drives into 720K IBM compatable drives.
**DD82: Unix** - Contains a working demo of Minix - a Unix workalike. Minix is system call compatable with V7 of Unix.

## FUN DISKS

**FD5: Tactical Games** - BullRun - a Civil war battle game, Metro you play the role of a city planner. Build wisely and your system will be a success, but poor planning will lead to disaster and financial ruin. Very very habit forming.
**FD6: GAMES!** - This disk is chock full of games including; Checkers, Clue, Gold - A new slide the pieces puzzle, Jeopard - An enhanced version of Risk, RushHour - Surprisingly addicting, and SpaceWar - Best described as a cross between Combat-Tanks and asteroids.
**FD7: Pacman** - This disk contains several pacman type games including; PacMan87, MazMan and Zonix.
**FD9: Moria** -. This has great graphic controls, multiple spells, similar to Larn and Hack. Play time several weeks!
**FD10: HackLite** - A dungeon adventure game. Considered a must-have classic. This is the second release of this game on the Amiga. Great graphic interface. Play time several weeks!
**FD11: Las Vegas and Card Games** - Las Vegas Craps - The best Las Vegas Craps simulation every written for any computer. Contains extensive HELP features, Also Thirty-One,VideoPoker and more.
**FD12A,FD12B: Star Trek, The Game** - This is by far the best Star Trek game ever written for any computer. It features mouse control, good graphics, digitized sound effects and great gameplay. Counts as 2 disks. Req. 1Mb and two drives (or hd).
**FD13: Board Games** - contains multiplayer Monopoly, Dominoes, Paranoids, and others.
**FD14: Dungeon Master Hints and Arcade Games** - DM maps, spells, item location, and hints and more, also on this disk, Hball - an arkanoid/breakout type game, Trix - a Qix type clone.
**FD17: Educational Games** - This disk includes several games for th younger members including geography, math, science, and word games, als includes Wheel of Fortune.
**FD20: Tactical Games** - MechForce(3.72); A game that simulates comba between two or more giant, robot-like machines. Simple words can't begin t give you the feel of piloting a 30 - 40 foot tall, fire breathing, earth shakin colossus that obeys your every whim.
**FD26:Arcade Games** - Marble_slide is a commercial quality game—simila to a Lucas game named PipeDreams, excellent playability and entertainmen Mutants—a small version of the same arcade game. SuperBreakout is Pong/Arkanoids type game.
**FD27: Arcade Games** - This disk is loaded with some great games. Includes Raceorama a great racing car game with ten different courses, MiniBlast helicopter gunship type clone, Shark in the same class as froger, an SBreakout the original breakout with more.
**FD29: Shoot'em up's** - WWII - you're the pilot of a WWII plane flying throug enemy territory, you've just been spotted, good luck on you mission, SpKiller try and penetrate enemy lines with this game, and Retaliator - another grea game.
**FD31: Games!** - Air Traffic Control - a good ATC simulation game, Blac Jack Lab - a full featured set of card games, ChessTel - play chess with you friend in distant and remote places with this game and a modem, labyrnth - well done text adventure game (like an infocom game), and MouseTrap - a 3 maze game.
**FD32: Flight Simulator** - An instrument flight simulator for a DC10
**FD33: Arcade Games** - Ffreddy a mario brothers type of game, Gerbils a ta get practice game, PipeLine a German interpretation of Pipe Dreams, Tron light cycles version, and wetroids a wonderful version of asteroids with a hilar ious twist.
**FD35: Omega (v 1.3)** - A new outstanding dungeon and outdoors adventur game in a similar vein as hack, rouge, and moria. This version is consider ably faster and better that all previous versions. Play time several weeks o months.
**FD37A&B:Tactical Games** - Empire (2.2w) This great game comes highl recommended. With a full-graphic front end.
**FD38: Games** - Cribbage Master - A great cribbage game and tutor, Spade - a well done card came, ChineseCheckers - A computer version of this clas sic, Puzz - a slide piece puzzle game and construction set.
**FD39A&B: Star Trek, The New Generation** - This is a, completely differen version of Star Trek than that found on FD12. This one was created by th German author Tobias. Now with English instructions. Excellent!!! Counts a two disks. Requires 512k
**FD44: Game** - Mechfight is an out of this world role-playing adventure com parable to hack and moria. The setting, interplanetary colonies and spac stations. In your quest to explore the world, take time out to liberate bad guy of their most valuable possessions, engage in a mortal combat or two agains robots and alien life forms, pick up a new Amiga 9000. Most of all, don't forge to stay alive...
**FD49:Chaos Cheats** - This disk contains an everything you wanted to kno about cheat set for Chaos Strikes Back, including full maps, spells, obje locations, super characters and more.
**FD50: Submarine Game** - Sealance, one and a half years in the making, thi is an outstanding submarine tactical game. Commercial quality, highly rec ommended.
**FD52: Classics Games** - PetersQuest a well done Mario brothers type c game, Jymbc a two player missile command clone, and Vstank a tank com mander game.
**FD53: Great Arcade** - On this disk is a wonderful implementation of the eve popular classic arcade game Defender. Also contain Air Race a WWII flyin ace arcade game, and Psycoblast new creation idea game.
**FD56: Arcade** - Includes SpaceWar. HueyRaid is a well done helicopte arcade game. PowerPong's a great expanded pong game.
**FD57: Arcade Games** - Includes 2 truly commercial quality games MegaBall, an Arkanoid-ish game, features 5 musical scores, multiple level and addicting gameplay. Gravity Attack is a psychadellic trip through severa different worlds—each distinctly different.
**FD58: GAMES!** - Includes Steinschlag; a great Tetris clone from German with music. SCombat: simulate battle between up to 40 players & monster Imperium Romanum: Battle up to 4 players for control of the Mediterranea in this Risk-esque game.
**FD59: Game Potpourri** - Xenon III is an almost exact clone of the comme cial game of the same name...a great shootemup. Crossword will take lists o words & automatically generate word-search puzzles for any Epson compa able printer.
**FD60: Games** - In Nebula, race over a 3d world to destroy enemy installa tions. Interferon; a great Dr. Mario clone. Enigma; is it a gameor a puzzle
**FD61: Games** - Solitaire; great graphics, plays two versions. Klide; an inte esting piece of eye candy. Extreme Violence; 2 player kill or bekilled game YATC; A Tetris clone with Artifical Intelligence. Genesis; create realistic 3 fractal worlds.

## WORKBENCH DISKS

**WB4:Telecommumnication** - This disk contains several excellent pd com munication programs designed to get you on line quickly and easily, Acces (1.42) - A very nice ANSI term program based on Comm v1.34, but with th addition of transfer protocols, Comm (1.34) - Last version of one of the be public domain communications programs ever made on the Amig Handshake (2.12a) Handshake is a Full featured VT52/100/102/22
**WB5: Fonts #1-** Several fonts (35) for the Amiga, also included are fiv PageStream fonts,and ShowFont - a font display program.
**WB6: Fonts #2** - ShowFont(4.0) This program allows you to quickly an painlessly view all 256 characters in a typical font. Large AmigaDos syste fonts (many up to 56pts).
**WB7: Clip Art** - This disk is loaded with black and white clip art. A includes, trees, watches, tools, US and State maps, and more
**WB9: Icons** - Truly a multitude of various types and kinds. Also include IconMiester, IconLab, and others great utilities to help generate icon
**WB10: Virus Killers** - The latest and best VirusX(4.0), Kv(2.1), an ZeroVirus III.
**WB11: Business** - Clerk(4.0), finally a full featured business accounting P program for the small to medium company. Includes receivables, payable end of month and uch more.
**WB12: Disk Utilities** - This great disk is loaded with wonderful utilities f everything including making disk labels, disk cataloging, disk optimizing, di and file recovery archive and organizing, and all sorts of file manipulation. must have!
**WB13: Printer Drivers and Generator** - over 70 different drivers, and these don't do it, with PrtDrvGen you can make your own.
**WB15: Business** - This disk contains a spreadsheet, a database, project/time management program and financial analysis (stocks
**WB16: Business** - This disk contains an inventory manager, a loan analys program, a great calendar/scheduler, a rolodex program, and pennywise good "Cash Book" accounting for home or office.
**WB18: Word/Text Processors** - This disk contains the best editor Includes,TextPlus (v2.2e) a full featured word processor, Dme(v1.35) a gre programmers editor with strong macro features,TexED(v2.8) an enhance Emacs type editor, and a spell checker.

**WB20: General Interest** - DiskSalv V1.42 a disk recovery program for all Amiga file systems, FixDisk V1.0 another file recovery program with features DiskSalv doesn't have, 3DLook gives a 3D appearance to your WorkBench, Clean V1.01 a program to de-fragment memory, Tracer - trace any part of an image.
**WB22: Fonts #3** - Several more great fonts. These, like the other font disks work great with Dpaint and WYSIWYG word processors.
**WB23: Graphics and Plotting** - Plot (20b) a three dimensional mathematical function plotter. Can plot any user defined function, BezSurf2 - produce awesome pictures of objects one could turn on a lathe. Can also map iff image files onto any surface that it can draw. Now compatible with most 3D packages, and VScreen - makes a virtual screen anywhere, great for DTP!
**WB25:Educational** - On this disk are two programs that can generate maps of differing types, World Data Base uses the CIA's data base to generate detailed maps of any entered user global coordinates. Also Paradox a great demonstration of Albert Einstein General Theory of Relativity.
**WB26: Disk Utilities #2** - MrBackup, KwickBackup - two well done utilities to do harddisk and floppy disk backups, FileMast - a binary file editor, Labelprinter - Disk label printer with very powerful features.
**WB27: Nagel** - 26 Patrick Nagel pictures of beautiful women.
**WB29: Graphics and Sound** - This disk has several different Mandelbrot type programs for generating stunning graphics. Includes, MandelMountains a realistic terrain generator, Fracgen - generated recursive fractals from user input, Mandelbrot and Tmandel - two fast mandelbrot generators, also Mostra - the best IFF display program to date, will display ALL IFF's including Dynamic HAM, and Sound - a great IFF sound player, will play anything. Try this disk!
**WB33:Circuit Board Design** - several terrific routines for the electronic enthusiast, Including PCBtool - a circuit board design tool, LogicLab - circuit logic tester, and Mcad (1.26) a well done new release of this PD CAD program, now comes with predrawn common circuit components for insertion into schematics.

## KAO 3½" Blank Diskettes DSDD

| | | |
|---|---|---|
| 10 for | $8.20 | (.82 cents ea) |
| 25 for | $17.25 | (.69 cents ea) |
| 50 for | $31.50 | (.63 cents ea) |
| 100 for | $61.00 | (.61 cents ea) |

**WB34: Utilities** - Several well done utilities, some will require moderate knowledge of a CLI or Shell for setup, Chatter Box - this one will play any user defined sound after any event (ie. disk insert, mouse click, disk removal...), , Artm - The Amiga real time monitor, gives you full control of the Amiga OS, very powerful program, Helper - help program to make learning the CLI easier, and more!
**WB35: 3D Graphics** - This disk contains several neat programs to use with your 3d modeling/raytracing programs 3dFonts - Full vector font set for use with 3d programs, FontMaker - make 3d fonts from any system font, Make3DShape - create 3d shapes from any image, DumptoIFF - create 3d animations preserves pallet, and World3d - a demo program of a front end for use with DKBRender.
**WB36: Graphics** - On this disk are several programs to create stunning graphical images including, MPath - creates swirling galaxy images, Roses - produce an unlimited number of variations of images that a symmetrically similar to a rose, SimGen - display those spectacular images as part of your workbenck screen, and RayShade - a very good raytracing program, create your own beautiful 3d graphic models with this one!
**WB37: Educational** - Educational games and puzzles that cover math, geography, spelling, and books. Ages 6 - 15
**WB38: Plotting and Graphics** - Plotxy is the most powerful full featured plotting package. Used by many colleges and universities. A welcome addition to our library! Highly recommended. Plans - a incredibly well done Computer Aided Drafting program, very full featured. Tesselator - a program that helps generates fantastic looking, recursive M.C. Ecsher type pictures.
**WB39: Music** - Intuitracker is a German offering of an exquisitely well done program that allows you to play music on your Amiga with CD like controls. Lets you strip out music from your favorite games or others and include them in your music library.
**WB40: Music** - "CD on a disk", 90 minutes of modern music on this well presented collection. Requires 2 drives or HD.
**WB41: Music** - MED an incredibly well done, full featured music editor. Create your own stunning music directly on your the Amiga. Similar to SoundTracker but better. Very powerful easy to use program. Version 3.20, which is compatable with WB2.04.
**WB43: Business** - This disk contains AnalytiCalc - probably the most powerful spreadsheet program on the Amiga. A full featured spreadsheet with many features expected in a commercial package. Requires 1.2 MB of memory!
**WB46: Clip Art** - HighRes clip art with the following motifs - embellishments (borders, dodads ,...), people, and transportation.
**WB47: Clip Art** - HighRes clip art with the following motifs - hair, drafting, summer, animals and macfood.
**WB48: Clip Art** - HighRes clip art with the following motifs - Holidays, music, medical, and misc.
**WB49ABC:Animation Sampler** - On this three disk sampler set (counts as two disks) are some of the best animations that have been created over the last three years. Several examples of "Movie" type animations some with spectacular raytraced reality (coolroby, watch, spigot and egg). Also several European style or "Demo" animation with incredible graphics and outstanding electronic music (akrilight, copersine, doc, dps2010, impact, and logodemo). These truly show off the creative edge of an Amiga!
**WB50: Animation** - Seven of the best european style animations or "Demos", including - scientific 451, subway (a U.S. entrant, also our favorite), unride, thrstdemo, tnight, waves, and woow.
**WB53: Graphics** - Raytracing programs generate absolutely stunning realistic looking planes, rockets, buildings..., and surreal images often consisting of highly polished spheres and objects. C-Light is the most powerful EASY-TO-USE of it's kind we have seen to date. This is easily better, and more full featured, than similar commercial programs costing in the hundreds of dollars. Also, sMovie - a full featured video text titler similar to ProVideo, Broadcast Titler. Great video scrolling, wipes, special effects, and more...
**WB54: Printing** - This disk contains several routines to help with the chore of printing. Includes Gothic - Finally a Banner printer for the PD! PrintStudio a well implemented all-purpose printer-utility with a very comfortable graphic interface and many advanced features, Lila - with ease, print ASCII files to a PostScript printer, and many more.
**WB55: Application** - XCopyIII - a full featured disk copier, make backups of copy protected disks. RoadRoute - find the quickest route from one city to another, highway description included. Diary - a diary program like "Dougy Howard M.D", Cal - a calendar program, Magman - a database tailored to maintain records on articles and publications.
**WB57: Animation** - This disk has several "Demo" style animations, including, Blitter, Lolly, Sun5, vertigo, vortex, and xenmorph.
**WB59: Business** - contains a great, very full featured stock market technical analysis and tracking program, also an appointment calendar, and more.

Circle 14 on Reader Service card.

**WB61: Intermediate Utilities** - Includes programs to help to drasticaly decrease flicker in interlace and hi-res modes (antiflick), an Atari-st emulator, an eprom programmer, turn your amiga into an eight channel digital data analyzer or ocilloscope, and more.
**WB62: Midi Utilities** - Several useful midi utilities including, programs to transfer to and from several music programs to midi, a midi sysex handler, a midi recorder with timebase, display midi info, file sequence player, and a few scores.
**WB63: Disk Utilities #3** - Several highly recommended programs to aid in removing duplicate files from your hard drive, performing file backups, Binary editing, fast formatting, file recovery, disk track recovery, and forced DISK VALIDATION of corrupt disks.
**WB66: Icons #2**- Lot's of neat icons. Also, several wonderful programs that to let you create your own icons, modify and manipulate icons and info structures.
**WB68:Music Utilities** - several good utilities for the Amiga music enthusiast. Includes, Noisetracker - a great music creation program, Sonix2MOD - converts sonix to .mod files which then can be used by noisetracker, soundtracker, and MED, SpeakerSim - a speaker design tool demo, Wondersound is an additive harmonic instrument design tool with a separate envelope design window and 16 relative harmonic strength and phase angle controls.
**WB69: Music** - This disk has over 90 minutes of classical and modern electronic music for you Amiga.
**WB70: Desk Top Pub** - Atcp - transfer Macintosh screen fonts, Mac or IBM format .AFM metric files, to Amiga screen fonts and PPage .metric files. With this program, open the door to the libraries of Adobe and PostScript fonts! Calendar - month templates in PageStream form. Post - a full featured postscript file display and print utility.
**WB75: Music** - over 100 instruments files (.inst) and sample sound files (.ss) for your music programs.
**WB76: Applications** - This disk contains Stichery - a often requested knitting design program, Lotto - a rather complete lottery tracking and prediction utility, SSS - this screen capture program can grab almost any screen including games, Today - a personal calender, Tarot - fortune teller, and Grammar - grammar checker.
**WB79: Home & Business Accounting** - Includes Ckbacct - the most complete checkbook accounting program going, LCDCalc - this well done calculator has a very large display and operates from the keyboard or mouse, Mileage master - monitor your automobile mileage with this mileage log, Grammar - a grammar checker, and Worldtime - find out what time it is in up to 50 global cities.
**WB81: Great Applications** - DataEasy a very easy to use, database program. Don't let the ease of use fool you, this is a very full featured database program including full printer control for address labels and mail merge applications. Also includes, TypeTut a good typing tutor, RLC a full featured label printer, Banner, a multi-font banner maker, and Budget a home accounting in a program. Highly recommended.
**WB82: Animations** - Four full length, well done "movie" style animations. Including, Coyote, JugglerII, GhostPool, and Mechanix. 2 disks, counts as 1.
**WB83: Computer Art** - this disk has some of the best Amiga generated computer art that we have collected in the past 5 years.
**WB85: Graphics** - Contains several programs for manipulating 24 Bit color images (ham-e) and a rather nice Iff Image processing package.
**WB86: AmigaVision** - Contains the Centurion Press, An Amiga newspaper by Lou Wallace.
**WB88ABC: The Complete Bible** - A three disk set, with the entire text of the New Testament and Old Testament-King James version. Great search/print utilities. Three disk set, counts as three.
**WB90: Rippers, Strippers and Beats** - For the Amiga music enthusiast, this disk contains many programs designed strip music from your favorite games and programs. Music can then be played with your favorite Pd Music program. Also contains Drums, a very nice drum machine. This disk requires some knowledge of the CLI.
**WB93: Workbench Extras #2** This disk contains the utilities that Commodore should have shipped with the Amiga; VirusX4.0, Snap, FixDisk (recover corrupt/deleted files), Disk Optimizer (floppy & hard), MachIII (screen blanker, hotkey, mouse accel., macro, clock utility), GOMF (a guru-buster)and PrintStudio.
**WB95: Checkbook Accountant 2.1** - This is definitely commercial grade; we've seen many checkbook programs and this is absolutely the best. Full budgeting, transaction recording and report generation.
**WB96: Dupers** - Contains XcopyIII & Nib which will backup copy-protected programs. FreeCopy removes copy protection from several programs, and SuperDuper will crank-out fast AmigaDOS copies.
**WB98: Business** - Includes BBaseII a nice, powerful database; BizCalc—a personal or mortgage loan calculator with amortization capabilities, Loop—a flowchart maker, Formmaker - design professional forms on your Epson LQ-2500 compatible printer.
**WB99: Lifestyles** - Includes AGene—family tree program that tracks up to 600 people/marriages/etc. Landscape is a CAD program to create gardens/landscapes. Loom simulates an 8 harness loom; experiment with pattern design in an instant feedback environment.
**WB100: CaligariPRODemo** - Can't afford $3,000+ to see if the granddaddy of 3D rendering software is for you? No built-in save function, requires 68020+.
**WB101: Chemesthetics** - is a program that displays molecules as a calotte model. This kind of display contains a certain esthetic attitude, even extremely poisonous molecules like nicotine and dioxine look quite nice.
**WB102: Telecommunications** - Contains the programs NComm 2.0 and VT100-29B. Zmodem protocols, XPR protocol support, full VT100 emulation. NComm's script language is so powerful it comes with a script file that creates a full-featured BBS system.

## Dev Disks

**DD45: AREXX Programs** - This disk contains several useful arexx programs and examples, PopCLI4 - The latest of a must have utility.

AmigaDOS 2 Release

## It's Here!

Release 2.04 of AmigaDOS for the A500/A2000!!! Includes ROMs, disks and full documentation. Requires installation.

**$95.00**

## WB105A&B: Workbench 2.0 Extras #2

This set contains the programs that should have been included with WB2.0. These powerful utilities take full advantage of the *many* new capabilities that are available in Workbench 2.0.
**Tool Manager** - a wonderful utility to add programs to your TOOL menu, create a collection of icons on the workbench to easily launch frequently used programs...and much, much more! A true must have utility!!!--*All* of our Amigas rely heavily on this utility.
**Virus Checker** - Full virus protection can be yours by simply dropping this icon in your WBStartup drawer.
**Icon** - Enhances Workbench's "Show All" to display over 40 distinct icons for different types of files (text, IFFs, source codes, libraries, sound samples, etc)
**Font Editor** - Create/edit bitmap fonts with full color support!
**Screen Blankers** - ala fractals and spliners! No more boring black screen. Colorful, interesting and highly hypnotic effects!
**Requester Enhancers** - no more stale "Please Insert Volume" requesters—these are animated requesters for *all* of the system's requesters.
**CPUBlit** - speeds up text displays for owners of 68020+ CPU's.
**SafeReboot** - adds a safe way to reboot your computer...can greatly reduce disk validation errors!

**Two disk set, counts as two.**

**DD47: Pascal** - This disk contains everything needed to program in Pascal. Includes, A68k (1.2) 68000 assembler, Blink linking software and PCQ (1.0) a modest Pascal sub-set compiler.
**DD49: C Compiler** - contains zc(1.01) fully K&R, zcc(1.0) front end, A68k(1.2) assembler, Blink linker.
**DD50: ARexx #2** - a must have set of tutorials on ARexx and several useful examples and utilities for ARexx development.
**DD51: Circuit Analysis** - Aspice (2.3) A full featured program for electric circuit analysis.
**DD52: Scientific** - Includes Elements - an incredibly well done periodic table program with source, Scientific plotting - over 600k of Lattice C source routines that can be included in your own programs.
**DD54: Compression** - This disk is loaded with all of the best file compression programs and aids for the Amiga. Many of the programs can be used by the new user. Includes Arc, Lharc, Lhwarp, Pkax, PowerPacker a must have by all, Zip, Warp, and Zoo. Also IFFcrunch an excellent compression for IFF files.
**DD55: ARP** - On this disk you will find the complete ArpRel3.0 release including the full user docs, the full Developers guide. ARP is the official AmigaDOS Resource Project (ARP) release 1.3. ARP makes many improvements to AmigaDOS and makes your system easier to use from the CLI.
**DD57: Advanced Utilities** - Msh - like Cross-dos, copies files to and from MS-DOS, Pal-NTSC - convert any pal program to NTSC and vice versa, Also several utilities that improve your startup-sequence, plus 25 more programs.
**DD62: Basic and Xscheme** - Cursor - a full featured Amiga Basic compiler, sbasic and ftext - several wonderful routines to help in basic programers, and Xscheme - an interpreted object oriented language.
**DD66: Programming ToolBox** - Many programs to help in your development efforts (most for C some for basic) Includes programs to generate requesters, an incredible spritemaker toolbox, to greatly aid compiling, convert DPaint brushes to C structures, a great library manager, and many more wonderful time savers!
**DD69:Advanced Utilities** - SerNet and ParNet - Connect two Amiga's and share resources, MemMonitor - Similar to WFrag but greatly improved, Selector - put menus on your workbench screen, and more.
**DD71A&B:C Compiler** - This disk contains DICE, Matthew Dillon's full featured, powerful C compiler and environment system. 2 Disks, counts as 2.
**DD72: VT Emulators** - Contains three powerful full featured VT emulators, with many advanced features including Kermit, Xmodem and Tektronix protocols. VaxTerm, VLT, and more.
**DD77: Fortran** - Contains a full featured FORTRAN77 environmental development system. Also contains EzAsm a strongly macro dependent 68000 assembler.
**DD78: Menus & System Enhancements** - Several neat programs to aid in launching programs from special icons (Next computer style), adding WorkBench menus and more. Also contains many useful programs to determine operation system configuration, memory usage, load and many other important utilizations.
**DD79ABCD: Amiga C Tutorial** - This is the most comprehensive C language, Amiga orientated set of tutorials available. Includes full working examples, source code and an incredible set of lessons. Included are full discussions and examples of every topic on Amiga programming. 4 disk set, counts as 3.
**DD80: VFont System** - A font rendering system that extends the Amiga so that it will be able to use vectorized outline fonts. Fast rendering, rotating, and sizing. For use in your own programs!
**DD81: ARexx Tutorial** - Includes several sample Arexx scripts and sample programs. Also includes APig; a library that gives you access to Intuition from within Arexx scripts.

DEALER INQUIRIES AND SUBMISSIONS WELCOME.

## Please send me the following disks:

Enter disk ID (Example: DD17, FD12, WB10)

______ ______ ______ ______
______ ______ ______ ______
______ ______ ______ ______
______ ______ ______ ______

Total disks ____ @ $______ ea. = $______
Disk based catalog ($2.50) = $______
Anti-Virus ($19.95) = $______
Kao Blank Disks #____ = $______
CA Residents add 7.75% sales tax = $______
Foreign Shipping = $______
**Handling = $ 3.00**
Total Due = $______

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**TSP5: Games 3** CrossCircuit is a one or two-player action/logic game that requires fast reflexes. WordSearch will allow you to generate your own word-search puzzles. In DrugBusters you rid the streets of cigarettes, alcohol, pills and needles. In Cinco you try to get five X's in a row before your opponent. ColorLogic is an excellent MasterMind type game.
**TSP4: Games 2** Dyno-Wars—a strategic checker-style game. Kooties—assemble a bug before the computer beats you to it. BlockBuster is a colorful, well done Tetris-type game. Warrior is a fun shoot'em-up adventure game. MicroMan is a graphic maze game played with a joystick. Battle the computer's armies to take over the planet in Circe.
**TSP3: Games 1** Crystal Caverns is a clone of the arcade game—colorful, complex graphic adventure game. Dot2Dot is an adaptation of the classic 2-player connect-the-dot game. PizzaDeliveryMan has you running through the streets to get those pies to your customers. TinyBall is the world's smallest baseball game. Surround-Cycles is a high-speed arcade game, based on the light cycle races from the Disney movie Tron.
**TSP2: Sounds** Animal sounds, musical instruments and many, many more—43 sound samples in all!
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**TC33:** Measures 1.0 is an incredibly useful utility that will convert any type of measurement to another. DiskLabeler is a database designed for storing and printing 3." disk labels. Jewels is a Tetris-esque game of action and strategy. Switch is a fun board-game. Gfxclipper will allow you to grab any screen and save it as an IFF picture. Softball Manager is a database for storing stats for softball—any number of leagues may be tracked. WBExec allows you to execute CLI commands from within the Workbench. Several Clipart images are also included.
**TC32:** Computer Coloring Book is a delightful program for children of all ages—comes with 15 pages of pictures to color again and again. Listmaker lets you make, edit, combine and print lists of words—great for those spelling tests! Moresmooth! scrolls text files smoothly on the screen and allows easy printing. Pocket Billiards lets you choose from several of the most popular pool games with realistic action. Texture allows you to create, manipulate and save (in standard IFF format) realistic fractal textured surfaces. Plague is a monster maze game. Also includes Screen Fader, Snowbench, and FlipBench.
**TC31:** Calendar Publisher is a professional-caliber calendar maker that is customizable. CrossCircuit is a 1 or 2 player action/logic game that calls for fast reflexes and thinking. APR is a much-needed printer utility. Pizza Delivery Man is a maze game where you deliver pies in your neighborhood. Multiplayer is a single program that will let you see IFF pictures/brushes or playback IFF sound samples. Also includes RAMgauge, 3-D vector objects and Hi-Res IFF brushes of maps and flags of European countries.
**TC26:** Word Search Maker lets you create word-search puzzles. TimeCalc is useful for anyone who has to calculate hours and minutes (great for adding up times of CD's to make tapes!) Drugbusters is a fun game where you get rid of cigarettes, booze, pills and needles. Wordfinder lets you search binary or text files for a particular word or string (good for getting hints in your adventure games!). KeyClick will add a small audible click to your keys and MouseClick will do the same for the mouse buttons. Seawar is a game between the Allied Navy and the Empire Fleet. Plus Early American 3-D vector objects, digitized sound effects, and a directory program.
**TC25:** ScreenToIFF captures your screen to an IFF file. PopColors lets you change the colors of your Workbench screen. Warrior is a fun shoot'em-up/adventure game for one or two players. Kaleidoscope is a line drawing program. Blockbusters is a game where you get rid of blocks by pushing matching blocks into them. Amidemo will show-off your Amigas ability to do solid-polygon animations. Microscope lets you examine memory at any location. Also includes Hi-Res IFF brushes of all 50 states and 10 Canadian provinces, nine digitized sounds and two small disk utilities and printer utility.
**TC24:** TableMaker is a tool for effortlessly building numerical tables. Kooties is a fun game where you have to assemble a bug before the computer beats you to it. HyperText lets you put links in a text file to other text, graphics, sound, animation, ARexx and other applications. The Little Black Book is a wonderfully useful telephone and address book. Color Logic is a MasterMind-type game. Also includes several disk and memory utilities—and some animal sound effects to top it off.
**TC23:** WhereIs lets you quickly and painlessly find a misplaced file on your drive. Select creates a window from which you can run your favorite programs. MatheMagic lets you find the day of the week for any date in the century, also lets you enter statistical data to be analyzed, graphs data, and solves linear algebraic equations. Pointer List Maker lets you create your own pointers or import pointers from other programs and save them in a disk file. Dyno-Wars requires more strategy and thought than your regular checker board game. Also includes Mr. Monster and Trilion games, 3-D objects, six sound effects and an animation of a pretzel.
**TC22:** Amiga Checkbook is a fast checkbook manager with check printing ability, budget analysis, and a report writer. AmiCrypt is a file encryption/decryption tool to password-protect any file...a must for security. WaveSyn lets you design musical instruments and waveforms for use in other programs. It also lets you play your keyboard like a piano. Cinco is a game where you try to get five X's in a row before your opponent does. AlterCLI lets you change attributes of your CLI window (width, title, depth, height, location, colors) with a single command—very useful for scripts. Also includes an animation by renowned Amiga-artist Lou Markoya, as well as 3-D objects.
**TC21:** Circe is a "risk-style" game where you battle the computer to take over the planet. Batchman allows you to execute CLI programs, batch files and ARexx scripts by simply clicking on a gadget. Colors prints color test sheets and assigns RGB values to printer and screen output....absolutely invaluable to achieve the best color printing results. Easyfile is a powerful database for home or a small business. Sprite Editor lets you easily create animated sprites. Plus 3-D fruit objects and five sampled sounds.
**TC16:** Cyberscape generates complex 3-D vector objects of terrain and saves your objects in Sculpt or Turbo-Silver format. Mathplotter graphs mathematical equations in both 2-D and 3-D. Double Print prints your text files on both sides of the paper. Metamorph, a graphic adventure game, Tinyball—the worlds smallest baseball arcade game and 6 digitized sound effects.
**TC15:** Labelmaker is a very easy to use label program. SurroundCycles, a high-speed arcade game. Dot2Dot, an adaptation of the classical connect-the-dot game. A tutorial on animation techniques by Amiga-artist extrordinaire Brad Schenck complete with one of his animations. Also includes a collection of clip-art and more animal sounds.
**TC14:** AmigoFile is a database and address book. Graph 3-D lets you visualize complex data in a 3-D manner and save the results. Spectrogram analyzes and displays digitized sounds. Pteronadonaball—an animation by Lou Markoya. Also includes 3-D Tic Tac Toe, 3-D objects, food clip-art, and sampled sounds.
**TC13:** StrucGen lets you create gadget, text, bitmap, and window structures and writes the C source code for you. LifeCycles plots your biorhythms. Create spectacular images with Mandelbrots. Look, a CLI utility that helps you find files on your disk quickly and easily. Plus 3-D objects, holiday clip-art, an Amiga Flight animation, drive head cleaning utility, and technical discussion on how AmigaDOS stores information on disk.
**TC12:** TJFormat formats disks that AmigaDOS normally wont. ChartMaster is a powerful graphing tool. MoreCandy generates an assortment of colorful graphic patterns and allows you to save them to disk. Shark, a game where you have to eat all the little perch you can catch to stay alive. Plus B&W clip-art for desktop publishing, spaceship 3-D vector objects, an animation, and Speakeasy (C source code for the programmer who wants to add speech to C programs).
**TC11:** DiskSalvage will fix corrupted disks and recover deleted files. IconMeister is an advanced Icon editor. AlienDuel is a fast, shoot'em-up game. Crystal Caverns is a colorful, graphic adventure game like the arcade game. Also includes an animation, sound samples, 3D dinner table objects, and Hi-Res monster clip-art.

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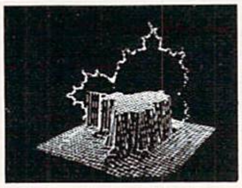
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The upgradable alternative from CSA

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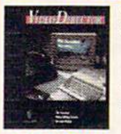
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You want to get that 2.04 ROM, but...what about the stuff that doesn't work? Or you want your 1000 to autoboot off the harddrive. DKB offers the solution. An easy-to-install board that allows you to switch easily between 1.3 and 2.0.
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# THE LAST WORD

*Kudos, complaints, comments, concerns, and contributions from our readers.*

## Russia Calling US

The development of market economy in Russia needs help of western civilization. And the most efficient help would be economic collaboration in high technologies. I would be most grateful should you publish the following invitation to joint hi-tech project.

I represent a Russian firm, Delta Popolam. Its personnel is highly qualified in software design, system engineering, and videoproduction. The firm has a broad experience in marketing of hi-tech goods and services in Russia and the rest of the former Soviet Union. One of the projects in work is development of Russian version of the program DeluxePaint III.

We are planning to organize in Moscow an Amiga demonstration center—a videoproduction house with accent on 3-D graphics and animation. The company is also interested in distribution of Amiga computers, peripherals and software. For these purposes, we are searching for a foreign partner for a joint venture. The partner could make a contribution in the form of equipment. The primary output could be just above $30,000 to $40,000. Problems connected with repatriation of profits are solvable.

More details on this project are available upon request. Any advice will be also gratefully accepted.

***Guennady Matveyev***
*Delta Popolam*
*Tverskaya Ul., 15-126*
*103009 Moscow, Russia*

## The Last Word On WordPerfect

I am very tired of hearing how disappointed everyone is that WordPerfect will not be updated for the Amiga. I have had the misfortune of having to use WordPerfect (v. 5.1) on the PC and, to a lesser extent, on the Amiga, and I can tell you the loss is insignificant. The program is exceptionally difficult to learn on the PC—just ask anyone who has tried. Moreover, the graphics support is either nonexistent or pathetic in both cases. My suggestion is to forget WordPerfect and get something like ProWrite for the Amiga.

***G.U. Graham III***
*Loup City, Nebraska*

## The Dealer Advantage

Recently, I almost became a "computer widower" when my Amiga 2000 was struck by lightning, leaving it, as well as my printer and possibly my Sony 20-inch, virtually useless. What made it worse was that my unit had a Bridgeboard, a hard drive, and three megs of RAM.

**I haven't had this much fun with a computer since I had my Commodore 64.**

I sent the unit to my authorized Amiga dealer, the Vidcom Center in Texarkana. Morris Allen, the owner, confirmed the damage, but pointed out a fact that made my day, namely, that my homeowners insurance would probably cover the cost. He was absolutely right. Mr. Allen provided me with a new system and even customized it to match the old system.

My point is that, although you may save a few bucks by going through a mail-order company, it can never service your needs or equipment the way an authorized dealer can.

***Stephen Franklin***
*Bossier City, Louisiana*

## AmigaMath

I very much enjoyed reading "The Scientific Amiga" in your December issue, especially the piece about the Stanford Linear Accelerator Center and its use of the Amiga version of Maple V, the computer algebra system from Waterloo Maple Software. The Mathematics Department here at the State University of New York at Albany was a primary beta tester for that version, and we have been using Maple in our Amiga classroom for nearly two years.

Our setup is rather unusual in that we use a specially designed Computer Classroom (utilizing A2000hds and A2500s), with the entire course meeting there. Students simultaneously interact (in real time) with their computer, with the instructor at the blackboard, with the instructor's computer, and with fellow students. It is a remarkably exciting environment for learning, and it has changed the way we teach mathematics. We offer a full range of classes, from elementary calculus for non-math majors to upper-division courses in algebra and analysis.

***Herbert I. Brown***
*Mathematics Dept., SUNY,*
*Albany, New York*

## Happy Switch

I have recently purchased an Amiga 500 system after ten years of owning MS-DOS machines. I was really getting tired of playing catch-up with the MS-DOS community, continually having to add to my system to meet new software requirements. I finally learned that the 386-SX 16-MHz system is the new entry-level PC system. That was it! Now I have my A500, and I haven't had this much fun with a computer since I had my Commodore 64! IBM PC owners should have the kind of support from other users that I have seen in my area for the Amiga.

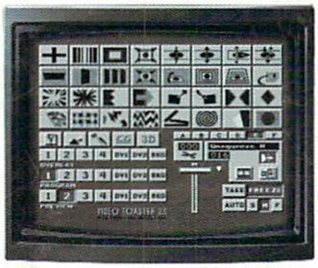
***Marc Chiarello***
*Oconomowoc, Wisconsin*

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## 9 essential tools you need if you're using your Amiga for video or graphics.

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Toaster System 2.0 includes organic switcher transitions like fire, smoke, clouds, pouring liquid and breaking glass. Powerful positionable effects for over-the-shoulder insets, soft-edge wipes and wild "KikiFX" like you've never imagined.

### Digital Video Effects



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### 35ns Character Generator




16 million color 35ns broadcast text with over 100 high-quality, anti-aliased type-faces. System 2.0 also features faster loading of pages, framestores for backgrounds, improved keying and text file import.

### 24-bit Broadcast Paint




ToasterPaint is the only true broadcast-quality NTSC paint system for the Amiga. System 2.0 brings new features including improved auto-scrolling and direct import of images from the Toaster's frame grabber.

### 3D Animation




LightWave 3D 2.0 offers over *150 new features* including blazing rendering speed, multiple morph targets, 3008 x 1920 resolution and *true ray-tracing!* 2.0 makes modeling a joy with new tools like bend, twist, taper, skin and magnet.

### Dual Frame Buffers



Hold two high-resolution 16 million color video frames in perfect YIQ-encoded RS-170A network quality. System 2.0 brings you enhanced hue matching, even faster loading, and framestore file compression to save disk space.

### Luminance Key



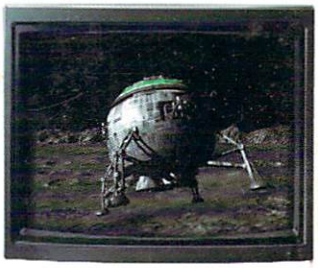
Much more than just simple weatherman over a map, Toaster™ keying lets you do luminance fade transitions, or combine two live sources using a third source as a key and even key-based digital trails.

### Color Processing



Control of color effects from the switcher and 20 new default effects make ChromaFX faster and more powerful. Now combine effects and color cycle with new organic switcher transitions for incredible new possibilities.

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